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Brocade VDX 8770-8

Hardware Installation Guide

BROCADE

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Document conventions

The document conventions describe text formatting conventions, command syntax conventions, and important notice formats used in Brocade technical documentation.

Text formatting conventions

Text formatting conventions such as boldface, italic, or Courier font may be used in the flow of the text to highlight specific words or phrases.

Format	Description
bold text	Identifies command names
	Identifies keywords and operands
	Identifies the names of user-manipulated GUI elements
	Identifies text to enter at the GUI
italic text	Identifies emphasis
	Identifies variables
	Identifies document titles
`Courier font`	Identifies CLI output
	Identifies command syntax examples

Command syntax conventions

Bold and italic text identify command syntax components. Delimiters and operators define groupings of parameters and their logical relationships.

Convention	Description
bold text	Identifies command names, keywords, and command options.
italic text	Identifies a variable.
value	In Fibre Channel products, a fixed value provided as input to a command option is printed in plain text, for example, **--show** WWN.

Convention	Description
[ ]	Syntax components displayed within square brackets are optional. Default responses to system prompts are enclosed in square brackets.
{ **x** | **y** | **z** }	A choice of required parameters is enclosed in curly brackets separated by vertical bars. You must select one of the options. In Fibre Channel products, square brackets may be used instead for this purpose.
x | **y**	A vertical bar separates mutually exclusive elements.
< >	Nonprinting characters, for example, passwords, are enclosed in angle brackets.
...	Repeat the previous element, for example, *member*[*member*...].
\	Indicates a “soft” line break in command examples. If a backslash separates two lines of a command input, enter the entire command at the prompt without the backslash.

Notes, cautions, and warnings

Notes, cautions, and warning statements may be used in this document. They are listed in the order of increasing severity of potential hazards.

NOTE
A Note provides a tip, guidance, or advice, emphasizes important information, or provides a reference to related information.

ATTENTION
An Attention statement indicates a stronger note, for example, to alert you when traffic might be interrupted or the device might reboot.

CAUTION
A Caution statement alerts you to situations that can be potentially hazardous to you or cause damage to hardware, firmware, software, or data.

DANGER
A Danger statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.

Brocade resources

Visit the Brocade website to locate related documentation for your product and additional Brocade resources.

You can download additional publications supporting your product at www.brocade.com. Select the Brocade Products tab to locate your product, then click the Brocade product name or image to open the individual product page. The user manuals are available in the resources module at the bottom of the page under the Documentation category.

To get up-to-the-minute information on Brocade products and resources, go to MyBrocade. You can register at no cost to obtain a user ID and password.

Release notes are available on MyBrocade under Product Downloads.

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Online	Telephone	E-mail
Preferred method of contact for non-urgent issues: • My Cases through MyBrocade • Software downloads and licensing tools • Knowledge Base	Required for Sev 1-Critical and Sev 2-High issues: • Continental US: 1-800-752-8061 • Europe, Middle East, Africa, and Asia Pacific: +800-AT FIBREE (+800 28 34 27 33) • For areas unable to access toll free number: +1-408-333-6061 • Toll-free numbers are available in many countries.	support@brocade.com Please include: • Problem summary • Serial number • Installation details • Environment description

Brocade OEM customers

If you have purchased Brocade product support from a Brocade OEM/Solution Provider, contact your OEM/Solution Provider for all of your product support needs.

- OEM/Solution Providers are trained and certified by Brocade to support Brocade® products.
- Brocade provides backline support for issues that cannot be resolved by the OEM/Solution Provider.

- Brocade Supplemental Support augments your existing OEM support contract, providing direct access to Brocade expertise. For more information, contact Brocade or your OEM.
- For questions regarding service levels and response times, contact your OEM/Solution Provider.

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- Through the online feedback form in the HTML documents posted on www.brocade.com.
- By sending your feedback to documentation@brocade.com.

Provide the publication title, part number, and as much detail as possible, including the topic heading and page number if applicable, as well as your suggestions for improvement.

Product Overview

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Product features

The Brocade device described in this guide is part of the Brocade Next Generation Data Center Networks product line, a highly robust class of network switching platforms that combines breakthrough performance, scalability, and energy efficiency with long-term investment. These chassis are designed to address the data growth and application demands of evolving enterprise data centers.

The Brocade device features the Brocade CloudPlex™ architecture, a fabric-based Ethernet technology that can present virtual desktops over a global network that integrates both static and cloud-based resources.

The Brocade device requires Brocade Network Operating System (Network OS) v3.0.0 or later. For details about Network OS, refer to the *Network OS Administration Guide*.

A key, licensable feature of the Brocade device is Brocade VCS ® technology, which includes virtual cluster switching, a new set of technologies that allows users to create flatter, virtualized, and highly available data center networks. VCS fabrics are scalable, permitting users to expand at their own pace, and simplified, allowing users to manage the fabric as a single entity. VCS fabrics are convergence-capable, supporting technologies such as iSCSI and network access server (NAS) as well as Fibre Channel over Ethernet (FCoE) (licensable) for storage.

Key features of the Brocade device include:

- A variety of external port types and speeds in supported line card modules
- Dual, redundant management modules (MMs)
- Up to six switch fabric modules (SFMs)
- Up to eight redundant, hot-swappable power supplies at 220 VAC or -48 VDC
- Up to four hot-swappable fan modules
- Serial (console), Ethernet, and USB connections for management modules

NOTE
USB support is for Brocade-branded USB devices only

- Support for short wavelength (SX) and long wavelength (LX) 1 Gbps SFP transceivers
- Support for (short range (SR) and (long range (LR) 10 Gbps SFP+ transceivers
- Support for 40 Gbps QSFP transceivers
- Support for 100 Gbps CFP2 (SR10 and LR4) optical transceivers
- Support for 10 GbE SFP+ optical transceivers
- Support for 1 GbE optical and copper SFP transceivers
- Support for SFP transceivers that enable you to adapt an SFP slot to a copper GbE interface.
- Support for fixed 10Base-T (RJ-45) copper transceivers

- Support for active twinaxial (twinax) cable at 1, 3, and 5 meters for 10 GbE ports
- Support for twinax and optical breakout cables for 40 GbE ports

NOTE
Support for the preceding optics depends on the installed line card. For details, refer to the "hardware components" and "line cards" sections of this chapter.

- NEBS-compliant chassis (certification in process)
- Support for in-band management
- 15U form factor for chassis
- Support for Brocade trunking through the 48x10 GbE and 48x10G-T line card modules
- Support for Fibre Channel over Ethernet (FCoE)

Hardware components

The device features a modular and scalable mechanical construction that allows a wide range of flexibility in installation, fabric design, and maintenance. The minimum chassis configuration is one management module (MM), one switch fabric module (SFM), and one line card. The chassis can be mounted with the cables facing the front of the equipment rack and consists of the following components:

- Eight slots for hot-swappable line cards that can be configured in a single chassis. Depending on the line cards installed, the following ports are available:
  - Up to 384 1/10 Gbps ports for the 48x10 GbE line card.

    48x10 GbE line cards support 10 GbE SFP+ and 1 GbE SFP optical transceivers, as well as 1 GbE copper SFP transceivers. They also support direct-attach 10 GbE copper twinaxial (twinax) cables at 1, 3, or 5 meters.
  - Up to 384 1 Gigabit Ethernet (GbE) ports for the 48x1 GbE line card.

    48x1 GbE line cards support 1 GbE SFP optical and copper transceivers.
  - Up to 96 40 Gigabit Ethernet (GbE) ports for the 12x40 GbE line card. Up to 384 10 Gbps ports are supported in QSFP breakout mode.

    12x40 GbE line cards support 40 GbE QSFP optical transceivers.
  - Up to 48 100 Gigabit Ethernet (GbE) ports for the 6x100 GbE line card.

    The 6x100 GbE line cards ship with two base 100 Gigabit ports enabled, but can be upgraded to enable six ports through the 100G Port Upgrade license. This upgrade license is supported by Network OS 5.0.0 and later. Ports support 100 GbE CFP2 (SR10 and LR4) optical transceivers.
  - Up to 384 1/10 Gigabit Base-T Ethernet ports for the 48x10G-T line card.

    48x10G-T line cards support fixed 10 GbE Base-T (RJ-45) copper transceivers.
  - Up to 216 40 Gigabit Ethernet (GbE) ports for the 27x40 GbE line card. Up to 576 10 Gigabit ports are supported in QSFP breakout mode.

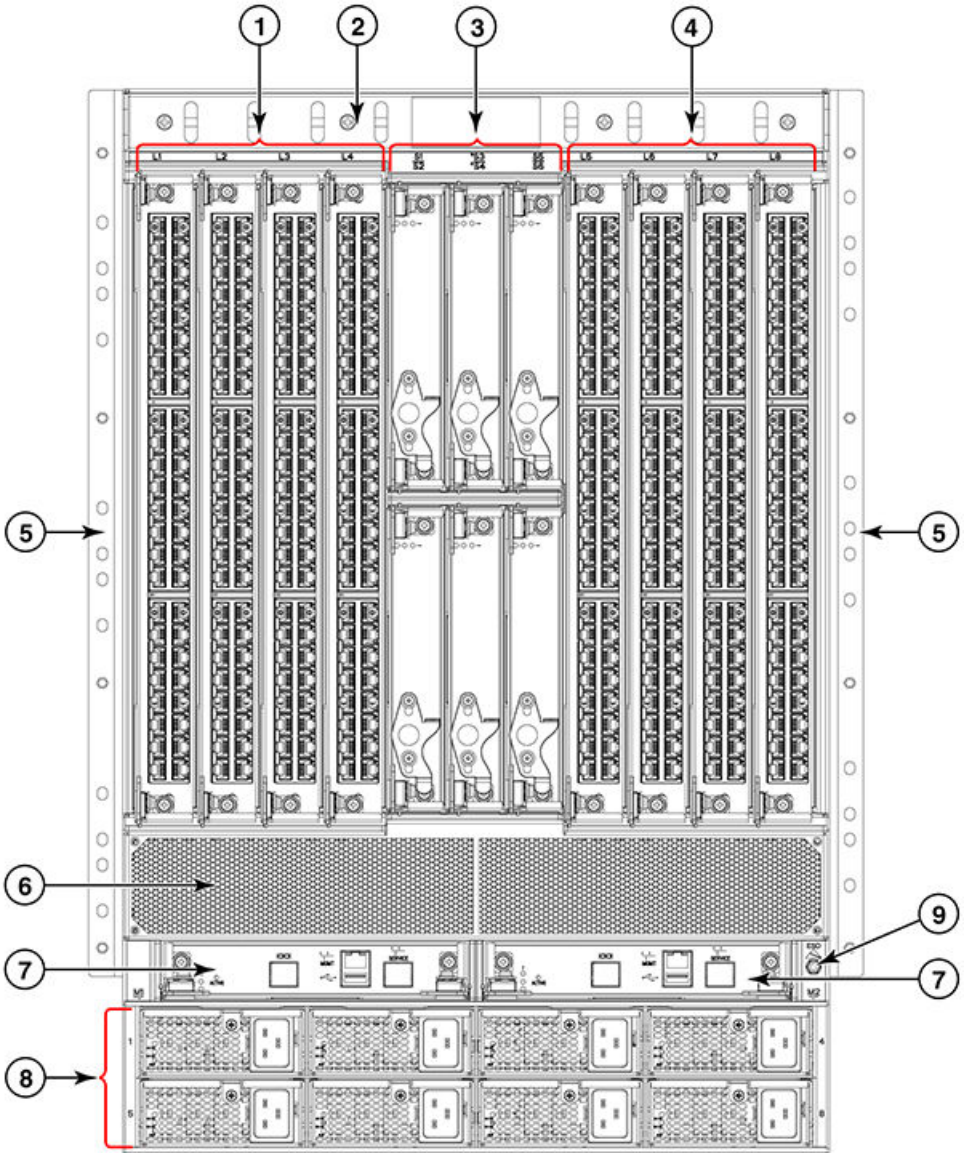
    27x40 GbE line cards support 40 GbE QSFP optical transceivers.
- Two slots for management modules:
  - A single active management module can control all ports in the chassis.
  - The standby management module takes control of the device if the active management module fails.
- Six slots for switch fabric modules that interconnect all line cards.

- Modular, hot-swappable field-replaceable units (FRUs):
  - 48x10 GbE line card
  - 48x1 GbE line card
  - 12x40 GbE line card
  - 6x100 GbE line card
  - 48x10G-T line card
  - 27x40 GbE line card
  - Four fan assemblies
  - Up to eight 3000W power supplies, 200-240 VAC auto-sensing or -48 VDC (each power supply connection should be separately fused)
- Cable management comb

Port side view

NOTE
Airflow in the Brocade device is from the port side to the rear (fan side) of the chassis.

The following figure displays a sample configuration of the port side of the Brocade device.

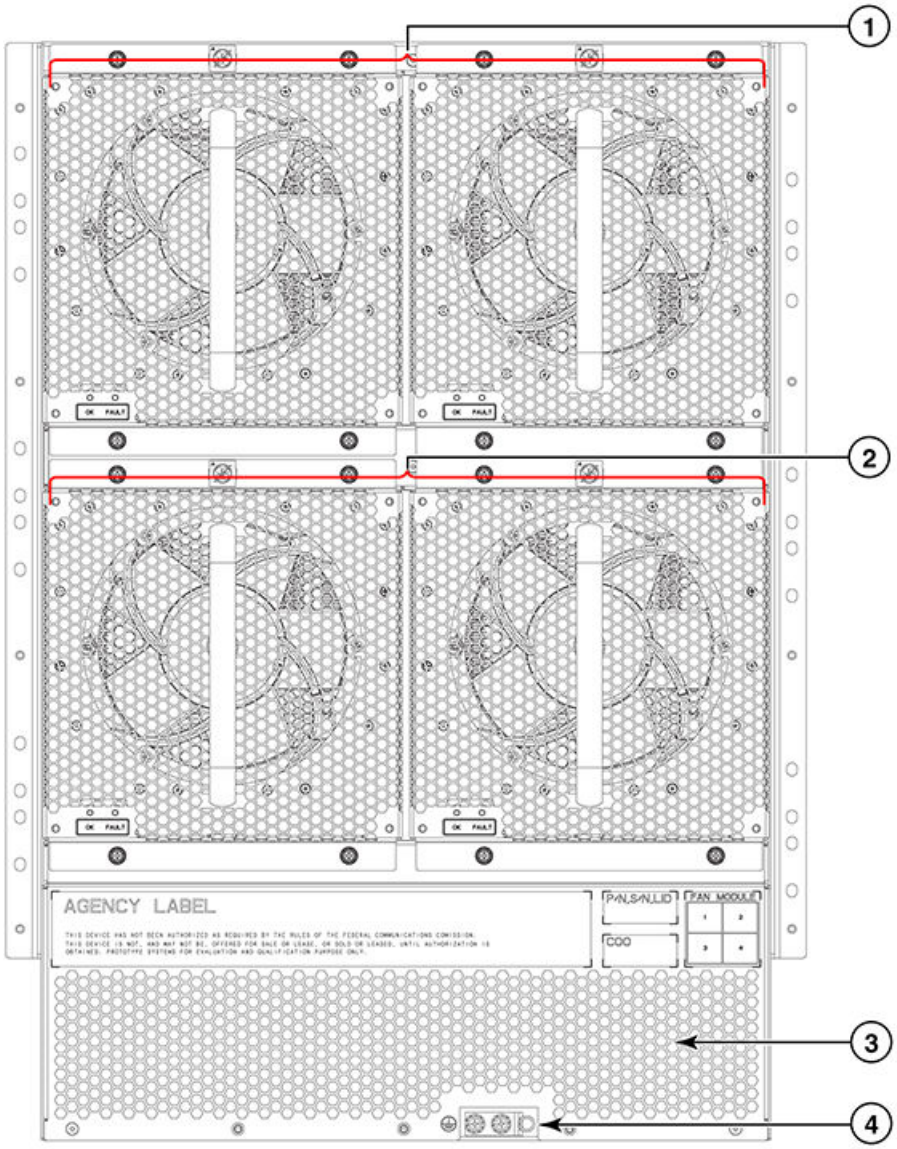


1 Line cards L1 through L4 (left to right)
2 Cable management comb
3 Switch fabric modules S1 through S6 (odd numbers above, even numbers below, left to right)
4 Line cards L5 through L8 (left to right)
5 Mounting flanges
6 Intake vent
7 Management modules MM1 and MM2 (left to right)
8 Power supplies 1 through 8 (1 through 4 above, left to right, 5 through 8 below, left to right)
9 ESD jack

FIGURE 1 Port side of the device (sample configuration)

Nonport side view

The following figure shows a sample configuration of the nonport side view of the Brocade device.



1 Fan assemblies 1 and 2 (left to right)
2 Fan assemblies 3 and 4 (left to right)
3 Power supply exhaust vent
4 Ground lug

FIGURE 2 Nonport side of the Brocade device (sample configuration)

Supported Line cards

The following table summarizes the line cards that are available for the device.

TABLE 1 Supported line cards

Line card	Description
12x40 GbE	12 40 Gbps QSFP Ethernet ports.
48x10 GbE	48 1/10 Gbps Ethernet ports.
48x1 GbE	48 1 Gbps Ethernet ports.
6x100 GbE	Two or six 100 Gbps Ethernet ports depending on licensing.
48x10G-T	48 1/10 Gbps Base-T Ethernet ports
27x40 GbE	27 40 Gbps QSFP Ethernet ports

Breakout mode

Quad SFP (QSFP) 40 Gbps ports on 12x40 GbE and 27x40 GbE line cards can be configured in breakout mode to create four separate 10 Gbps interfaces. You can administer and operate these interfaces as any other SFP port. Special breakout cables provide a connection to the 40 Gbps QSFP port and to four 10 Gbps SFP ports on another device. Twinax active copper cables at 1, 3, and 5 meters and fiber-optic breakout cables are supported.

NOTE
While 40 GbE ports are in breakout mode, port status (individual or as a group) cannot be determined from the port LED state color.

For more information on configuring breakout mode, refer to the *Network OS Administrator's Guide*.

Trunking

Network OS supports Brocade trunks (hardware-based link aggregation groups, or LAGs). These trunks are dynamically formed between two adjacent devices with connected interswitch link (ISL) ports unless trunking is disabled on connecting ports. Traffic is evenly distributed along all links in a trunk. For more information on Brocade Trunking and enabling and disabling trunking, refer to the "Configuring Brocade VCS Fabrics" chapter in the *Network OS Administrator's Guide*.

Trunking is supported on GbE interface ports of all line cards.

Port groups

Port groups are established for trunking on supported line cards. To successfully form a trunk from line card ports to another device, select ports from same line card port group and configure each port to operate at the same speed. Following are trunk and port group specifications for supported line cards:

- For the 48x10 GbE line card, up to 8 ports are allowed per trunk. Select ports from octet port groups consisting of ports 1-8, 9-16, 17-24, 25-32, 33-40, and 41-48.
- For the 48x10G-T line card, up to 16 ports are allowed per trunk. Select ports from three port groups consisting of ports 1-16, 17-32, and 33-48.

- For the 12x40 GbE line card, up to two 40GbE ports are allowed per trunk when these ports are configured in breakout mode to provide 10GbE interfaces. Select ports from six port groups consisting of 40GbE ports 1-2, 3-4, 5-6, and 7-8, 9-10, and 11-12.
- For the 27x40 GbE line card, 40GbE ports must be configured in breakout mode to provide 10GbE interfaces for trunking. There are nine port groups consisting of 40GbE ports 1-3, 4-6, 7-9, 10-12, 13-15, 16-18, 19-21, 22-24, and 25-27. The following rules apply to configuring breakout mode and trunking on ports in these groups:
  - You must configure a port group in Performance operating mode. Breakout mode is not supported on ports configured in Density (default) operating mode.
  - When the port group is in Performance mode, you can only configure the first two ports in the port group in breakout mode, since the third port in the group is disabled. Hence, trunking is only supported on the first two ports in the port group.

Trunking two 40 GbE ports

To form an 80 Gbps trunk between two 40 GbE QSFP transceivers on a 40 GbE line card for an ISL connection, use the following steps:

1. Configure each QSFP interface in breakout mode, as if you were connecting four separate 10GE transceivers, then reboot the line card.
2. Use a crossover MTP or MPO 40GE (12-strand) OM3/OM4 Fibre to connect the QSFPs to each other.

For more information on Brocade Trunking and configuring breakout mode, refer to the following:

- "Configuring SFP Breakout Mode" in the *Network OS Layer 2 Switching Configuration Guide*
- "Brocade Trunks" in the *Network OS Administration Guide*

27x40 GbE operating modes

The 27x40 GbE line card supports nine port groups of three ports each that you can configure for Performance or Density operating modes.

- Performance mode - Because the line card is oversubscribed and cannot support the 40 Gbps line rate on all 27 ports, you can configure *Performance* mode to achieve 40 Gbps rate for up to 18 ports. When a port group is configured In Performance mode, the third port in the port group is persistently disabled, but the remaining two ports operate at up to 40 Gbps to achieve the 80 Gbps maximum rate for the port group. QSFP breakout mode is only supported on ports configured in Performance mode.
- Density mode - This is the default mode for all the port groups. In this mode, all the three ports are enabled in each group, but cannot support the 40 Gbps maximum rate. If this mode is configured on all port groups, 27 total ports are available for use.

Configure Performance or Density mode for individual port groups using Network OS commands (refer to the *Network OS Command Reference*).

For configuring operation modes, ID numbers are assigned to each port group sequentially from port 1 through 27 as shown in the following table.

TABLE 2 27x40 GbE line card port groups

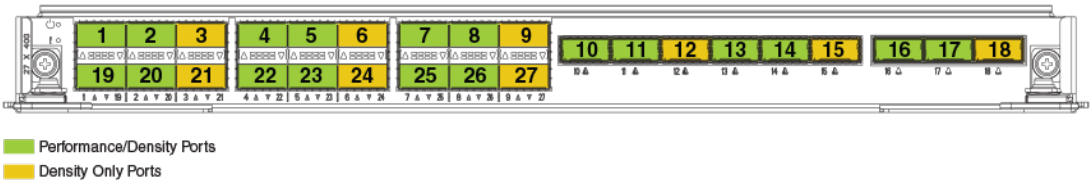
Port Group ID	Port Numbers
1	1-3

TABLE 2 27x40 GbE line card port groups (Continued)

Port Group ID	Port Numbers
2	4-6
3	7-9
4	10-12
5	13-15
6	16-18
7	19-21
8	22-24
9	25-27

Port groups for configuring operation modes are illustrated in the following figure. If you configure a port group in Performance mode, the first two ports in a group are enabled for Performance mode. The third port is disabled as it can only be configured in density mode only. I If you configure the port group in Density mode, all three ports are enabled for density mode. To identify the port group, use the format *rbridge-id/slot-id/port group-id*. For example, 1/3/9 denotes RBridge 1, slot 3, and port-group-id 9.

FIGURE 3 Port groups for configuring Performance and Density modes on 27x40 GbE line card



To configure Performance and Density modes for line card port groups using Network OS commands, refer to 27x40 GbE operating modes.

High availability

High availability is currently limited to management module configuration synchronization. Failover to the standby module will occur in case of active module failure, but the standby module will go through a cold recovery in which all system components are reset. This will disrupt traffic on the chassis. The reset could take up to eight minutes depending on chassis configuration and traffic load.

Device Installation

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- Providing power to the device..... 31

Time and items required for the installation

You can set up and install the Brocade device in the following ways:

- As a standalone unit on a flat surface
- In a 19-inch Electronic Industries Association (EIA) rack, using the four-post rack mount kit
- In a two-post telecommunications (Telco) rack

This section describes standalone installtion procedures only. For rack mount installation instructions, refer to the manual that comes with the separately ordered rack kit.

The following table describes the installation tasks, the estimated time required for each, and the items required to complete the task based on a fully populated chassis (384 10 GbE ports). Configurations with fewer ports require less time. These time estimates assume a prepared installation site and appropriate power and network connectivity.

DANGER

The procedures in this manual are for qualified service personnel.

TABLE 3 Installation tasks, time, and items required

Installation task	Time estimate	Items required
Site preparation and unpacking the device	30 minutes	#2 Phillips screwdriver Pallet jack. Hydraulic lift or assisted lift, able to raise to a minimum of 140 cm (55 in.), with a minimum capacity of 113 kg (250 lb). To know the weight of your device fully populated with the required port blades, refer to the Technical Specifications at the end of this guide.
Installing rack mount kit	30 minutes	Refer to the rack mount kit instructions for the device.
Mounting and securing the device in rack	30 minutes	

TABLE 3 Installation tasks, time, and items required (Continued)

Installation task	Time estimate	Items required
Installing power cables and powering on the device	20 minutes	Power cables (provided in the device accessories kit).
Establishing serial connection, logging on to the device, and configuring the IP addresses.	20 minutes	Serial cable (provided in the accessory kit). Workstation computer with a serial (console) port or terminal server port and a terminal emulator application (such as HyperTerminal). Ethernet IP addresses for the device and for both control processor blade (a total of three addresses).
Installing an Ethernet cable, opening a Telnet session, and configuring the device domain ID, date and time, and additional system parameters. Verify and back up the configuration.	20 minutes	Ethernet cabling (optional) for Telnet access. Refer to the *Network OS Administration Guide*.
Installing transceivers as needed	30 - 60 minutes (up to 30 minutes per transceiver	Copper and optical transceivers and direct-attach cables as needed
Attaching cables, cable ties, and cable guides	2-3 hours	Cables, cable ties, and cable management comb.

CAUTION

All devices with DC power supplies are intended for installation in restricted access areas only. A restricted access area is where access can be gained only by service personnel through the use of a special tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.

Items included with the device

The basic product (SKUs BR-VDX8770-8-BND-AC or BR-VDX8770-8-BND-DC depending on whether you order AC or DC power supplies) ships with the following items:

- A chassis, populated with:
  - Management modules (one)
  - Switch fabric modules (six)
  - Filler panels for unoccupied slots for all modules
  - Power supplies (up to three)
  - Power supply filler panels for unoccupied bays
  - Fan modules (four)
- An accessory kit containing the following items:
  - Console cable (RJ-45 serial cable: There is also an adapter that can be used to provide a DB9-style connector.)
  - Wrist strap (ESD grounding strap)
  - Ground lug kit

  - SFP extraction tool kit
  - China RoHS guide
  - Cable management comb
  - Brocade-branded USB device
  - Power cord retainer kit
  - Hardware for securing the device in a rack
  - Web pointer document
  - Air filter
- Line cards (up to eight) and additional power supplies must be ordered separately.

The rack mount kits must be ordered separately.

Brocade-branded transceivers (SFP, SFP+, CFP2, QSFP, or 10Base-T) and cables or direct-attach cables must also be ordered separately. The Brocade VDX 8770-8 supports SR and LR SFP, SFP+, and CFP2 transceivers. QSFP transceivers are SR transceivers only. Twinax active copper and fiber-optic breakout cables are supported.

For details on supported transceivers, refer to the following publications:

- *Brocade VDX Transceiver Support Matrix* at http://www.brocade.com/downloads/documents/matrices/brocade-vdx-sfp-transceivers-mx.pdf.
- *Brocade Ethernet Optics Family* data sheet at http://www.brocade.com/downloads/documents/data_sheets/product_data_sheets/brocade-ethernet-optics-family-ds.pdf.

NEBS requirements

The following table lists the installation requirements for meeting NEBS GR-1089 compliancy.

TABLE 4 NEBS installation requirements

Reference	Warning, requirement, or statement
Intrabuilding or Intra-connection	WARNING: The intra-building copper Ethernet ports of the equipment or subassembly are suitable for connection to intrabuilding or unexposed wiring or cabling only. The intra-building ports of the equipment or subassembly MUST NOT be metallically connected to interfaces that connect to the outside plant (OSP) or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 6) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.
First Level Lightning Criteria AC Power Ports	WARNING: The Brocade device must be connected to external Special Protection Devices (SPD) when installed and connected to commercial AC power.
Class A2 Voltage Accessibility	The Brocade device must be located in a restricted access location were only crafts personnel are allowed access.
Class B Voltage Accessibility	The Brocade device must be located in a restricted access location were only crafts personnel are allowed access.
Equipment Grounding Systems	The Brocade device must be installed and connected to the CBN, IBN, or Ether.
Communication Equipment Grounding	The Brocade device is suitable for connection to the Central Office.

TABLE 4 NEBS installation requirements (Continued)

Reference	Warning, requirement, or statement
Bonding of Battery Return (BR) Input Terminals	The battery returns of the Brocade device must be connected (DC-I).
Connections	The Brocade device must be grounded via a copper ground conductor.
Connections	All bare grounding connection points to the Brocade device must be cleaned and coated with an antioxidant solution before connections are made.
Connections	All surfaces on the Brocade device that are un-plated must be brought to a bright finish and treated with an antioxidant solution before connections are made.
Connections	All non-conductive surfaces on the this device must be removed from all threads and connection points to ensure electrical continuity.
Connections	The Brocade VDX 8770 utilizes a two-hole compression type, agency-approved crimped connector with a copper #2 American Wire Gauge (AWG) that utilizes 20 inch pounds of torque to secure it to the frame and EUT.
Input DC Voltage	The Brocade VDX 8770 is capable of operating at 200-240 V, 50/60 Hz at a maximum current level of 16.0 A max., or -48VDC, 70.0 A max. per power supply.
Thermal policy	Due to recent changes in the NEBS thermal policy testing procedures, Brocade has made changes to the thermal policy for the Brocade VDX 8770. These changes include an additional fan speed (raising the number of fan speeds to 4 from 5) and slightly altered trigger temperatures. Additional non-user visible RASlog message generation has also been included with this change to allow for easier debugging and thermal history recording. The precise values for temperature and fan RPM are related to the specific hardware combinations possible in the modular switch. For the sake of brevity, the following table lists the possible range of values for each heat level.

TABLE 5 NEBS thermal policy levels

Level	Description	Ambient temperature	Temperature	RPM
1	LOW	up to 25C	up to70C	2500 RPM
2	MED-LOW	up to 25C	from 48C through 80C	3500 RPM
3	MED	up to 39C	from 52C through 86C	5500 RPM
4	HIGH	up to 51C	from 65C through 93C	7350 RPM
5	MAX	up to 58C	from 73C through 99C	9300 RPM

CAUTION

For the NEBS-compliant installation of a Brocade device with AC or DC systems, use a ground wire of at least 2 AWG. The ground wire should have an agency-approved crimped connector (provided with the device) attached to one end, with the other end attached to building ground. The connector must be crimped with the proper tool, allowing it to be connected to both ground screws on the enclosure. Before crimping the ground wire into the provided ground lug, ensure that the bare copper wire has been cleaned and antioxidant is applied to the bare wire. In addition, anti-rotation devices or lock washers must be used with all screw connections for the grounding wire.

Preparing for the installation

Review the following before installing the device:

- Refer to Cautions and Danger Notices on page 107 to review safety precautions and translations.
- Refer to "NEBS requirements on page 21" to ensure compliance with NEBS-GR-1089 standards
- Refer to the Brocade VDX 8770 Switch Technical Specifications on page 95 to ensure power supply standards are met before installing the chassis and to review the to environmental requirements.
- Refer to "Preparing for the installation" section to plan for cable management.

DANGER

The procedures in this manual are for qualified service personnel.

NOTE

Brocade strongly recommends that devices be installed in environments that have minimal dust and airborne contaminants.

The following steps are required to ensure correct installation and operation.

1. Ensure that doorways are wider than 91 cm (36 in.) to accommodate the device.
2. Provide a space that is 15 rack units (15U) high, 61.29 cm (24.09 in.) deep, and 43.74 cm (17.22 in.) wide. One rack unit is equal to 4.45 cm (1.75 in.).

   Plan to install the Brocade device with the port side facing the air-intake aisle. Airflow is from the port side of the device to the fan side.

   Ensure that the rack is balanced and mechanically secured to provide stability in the event of an earthquake and that the equipment does not exceed the rack's weight limits.

DANGER

Make sure the rack housing the device is adequately secured to prevent it from becoming unstable or falling over.

3. Ensure that dedicated electrical branch circuits with the following characteristics are available:
   - Up to eight dedicated fused 200-240 VAC, 50-60 Hz feeds or -48 VDC (one per power supply)
   - One cable for each power supply

CAUTION

Use a separate branch circuit for each power cord, which provides redundancy in case one of the circuits fails.

- Protected by a circuit breaker in accordance with local electrical codes
- Supply circuit, line fusing, and wire size adequate to the electrical rating on the device nameplate
- Location close to the device and easily accessible
- Grounded outlets installed by a licensed electrician and compatible with the power cords

DANGER

If the installation requires a different power cord than the one supplied with the device, make sure you use a power cord displaying the mark of the safety agency that defines the regulations for power cords in your country. The mark is your assurance that the power cord can be used safely with the device.

4. Plan for cable management before installing the device.

   Cables can be managed in a variety of ways, such as by routing cables below the device, to either side of the device, through cable channels on the sides of the rack, or by using patch panels.
5. Ensure that the following items are available for configuration of the device:
   - Workstation with an installed terminal emulator, such as HyperTerminal
   - Console (serial) cable (provided)
   - Ethernet cables (not provided)
   - Either access to an FTP server or a Brocade USB device for backing up the device configuration or collecting **supportsave** output data (optional)
   - Transceivers (copper and optical) and compatible cables and direct-attach cables if needed
6. Ensure that the air intake and exhaust vents have a minimum of 5.1 cm (2 in.) of airspace.
7. Ensure that the air temperature on the air intake side is less than 40°C (104°F) during operation.

CAUTION

Do not install the device in an environment where the operating ambient temperature might exceed 40°C (104°F).

8. Ensure that the power requirements are met. Refer to the Technical Specifications" for a listing of power requirements per component.

CAUTION

For the DC input circuit to the system (3000W supply), make sure there is a 80 amp circuit breaker, minimum -48VDC, double pole, on the input lugs to the power supply. The input wiring for connection to the product should be copper wire, 2 AWG, marked VW-1, and rated minimum 90o C.

The power requirements for a given device configuration depend on which modules have been installed in the device. Refer to the Brocade VDX 8770 Switch Technical Specifications on page 95 for information on the power consumption for the modules that can be used in the device along with the power consumption for the cooling fans.

All numbers for the line cards assume that the card is fully populated with transceivers, including QSFPs for the 12x40 GbE and 27x40 GbE line cards. All ports are Ethernet.

You can calculate your power requirements by combining the power demands for the various modules and fan units in your configuration. While you may use fewer ports in a given line card, it is always safer to use the power requirement of a fully populated card.

Environmental requirements

Ensure that the environmental requirements are met. Refer to the Brocade VDX 8770 Switch Technical Specifications on page 95.

CAUTION

Do not install the device in an environment where the operating ambient temperature might exceed 40°C (104°F).

NOTE

The 0° to 40°C (32° to 104°F) range applies to the ambient air temperature at the air intake vents on the port side of the device.The temperature inside the chassis can reach up to 90°C (194°F) for some modules during operation. Brocade recommends that the internal temperature not exceed 75°C (167°F). Cooling policy is based on a combination of ambient temperature and measured temperature on the modules. Various combinations will result in an increase in fan speed to create more cooling in the device. If a component approaches a critical temperature that will trigger a module shutdown, there will be a WARNING message in the RASlog, followed by a CRITICAL message saying that the module will shut down in two minutes.Use the **show environment** command to view temperature status.

Chassis slots

Chassis slots are coded and numbered to differentiate between management module slots, switch fabric module slots, and line card slots. Management modules (MMs) must be installed only in slots M1 and M2. switch fabric modules (SFMs) must be installed only in slots S1 through S6. There must be at least one switch fabric module installed in either slot S3 or slot S4. The line card slots, L1 through L8, can be filled with any supported line cards. Unused slots must be filled with the correct filler panels to maintain adequate cooling.

Unpacking and installing the device

DANGER

A fully populated Brocade device weighs between 86.18 kg (190 lb) and 165.56 kg (365 lb) and requires a hydraulic or assisted lift to install it.

DANGER

Use safe lifting practices when moving the product.

1. Unpack the device.
   a) Cut the bands that encircle the packaging.
   b) Slide the upper portion of the cardboard shipping box up off the pallet and shipping tray.

NOTE

The product packaging incorporates a wood pallet and brackets. The device sits on top of a corrugated cardboard shipping tray.

c) Save the packing materials in the event you need to return the product.
d) Leave the device on top of the shipping tray and pallet if the device must be transported to the installation location.

2. Use a pallet jack or other assisted lift to transport the device to the installation area.
3. Using the rack mount instructions, install the rack components in the rack and mounting flanges on the device. The rack mount kit and instructions are shipped separately from the device.
4. Remove the accessory kit (cardboard box), packing foam, and anti-static plastic from the device and set them aside.
5. Remove the foam inserts around the base of the device.
6. Use a lift to raise the device to the correct level. If installing the device in a rack, follow the instructions provided by the rack kit manufacturer.
7. If applicable, lock the wheels of the lift.
8. Ensure that the device is oriented so that the port side (front) has access to intake air.
9. Gently slide the device onto the final installation surface, ensuring that it remains supported during the transfer.
10. Before you apply power to the device, you can install the management module, switch fabric module, and line card modules as well as power supplies to speed up your installation.

Port numbering

Use the illustrations provided to understand the port numbering for each line card supported on the device.

12x40 GbE port numbering

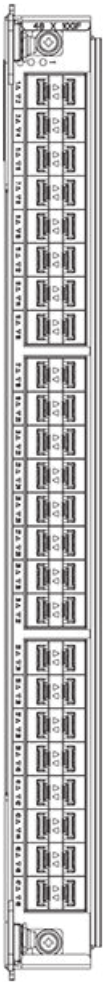
The following illustration shows the 12x40 GbE line card modules. Ports are numbered 1 through 12 from top to bottom when installed in the device.

FIGURE 4 12x40 GbE line card

48x1 GbE and 48x10 GbE port numbering

The following illustration shows the 48x1 GbE and 48x10 GbE line card modules. Ports are numbered 1 through 48, from top to bottom, with the odd-numbered ports on the right row and the even-numbered ports on the left row when installed in the device.

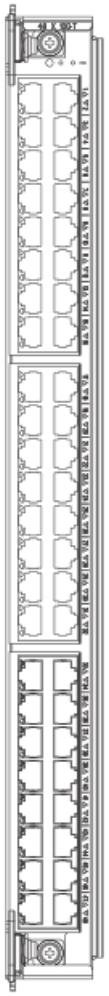
FIGURE 5 48x10 GbE line card (48x1 GbE line card is similar)



48x10G-T port numbering

The following illustration shows the 48x10G-T line card modules. Ports are numbered 1 through 48, from top to bottom, with the odd-numbered ports on the right row and the even-numbered ports on the left row when installed in the device.

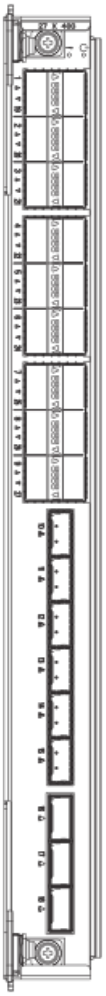
FIGURE 6 48x10G-T line card



27x40 GbE port numbering

The following illustration shows the 27x40 GbE line card modules. In the dual-port section, the top row of ports is numbered 1 through 9 and the lower row of ports is numbered 19 through 27, from top to bottom, when installed on the device. The single ports on the bottom of the device are numbered 10 through 18 from top to bottom.

FIGURE 7 27x40 GbE line card



6x100 GbE port numbering

The following illustration shows the 6x100 GbE line card modules. Ports are numbered 1 through 6, from top to bottom, when installed in the device. Refer to the following figure.

FIGURE 8 6x100 GbE line card

Providing power to the device

Complete the following steps to provide power to the chassis. Each power supply has one power cord.

NOTE
Use the supplied power cords. Ensure the facility power receptacle is the correct type, supplies the required voltage, and is properly grounded.

DANGER
Make sure that the power source circuits are properly grounded, then use the power cord supplied with the device to connect it to the power source.

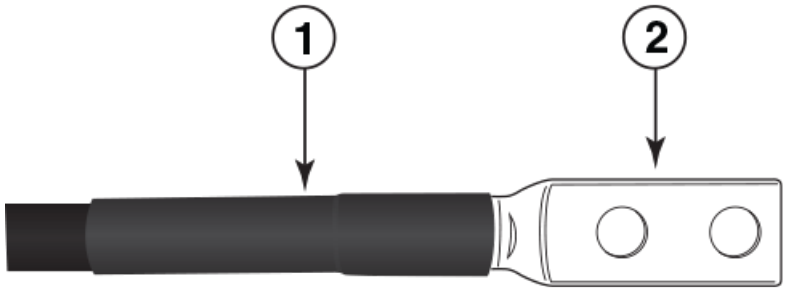
Connecting an AC power cord

1. Plug the power cord into the power supply.
2. Route the cable so it will be out of the way when connected to the power source.
3. Plug the other end of the cable into the power source.

Connecting a DC power cord

1. Use a #1 Phillips screwdriver to remove the screw that secures the safety cover over the power lugs and remove the safety cover.
2. Use a #2 Phillips screwdriver to unscrew the power lugs.
3. Obtain heat shrink tubing with the following specifications to install on the #2 AWG power supply input wire:
   - Inside diameter: 1.27 cm (.5 in.)
   - Minimum 2:1/50% shrink ratio
   - Nominal Rec. Wall Thickness: 30480 mm (.012 in.) minimum
   - Dielectric strength: 800V/mil
   - Tensile strength: greater than or equal to 5000 psi
   - Operating temperature: -40°C to +150°C (-40°F to 302°F) minimum
   - RoHS compliant
4. Cut off a 5.08 cm (2 in) lengths for each #2 AWG power supply wire.
5. Slide the tubing over the #2 AWG power supply wire.
6. Crimp the #2 AWG power supply wire into the power lug.
7. Slide the tubing over the lug to the brown strip closest to the lug holes.
8. Apply heat to shrink the tubing over the lug and wire insulation.

   Installed tubing and lugs on power supply wire should conform to the following illustration.



1 Heatshrink tubing
2 Power lug

FIGURE 9 Heat shrink tubing and lug on DC power supply cable

9. Connect the power lugs to the power supply unit.

   Connect the -48V wire to the negative terminal and the 0V wire to the positive terminal.

NOTE
The DC return must be isolated from the chassis ground (DC-I) when making connections to the power supply.

10 Replace the safety cover.

11 Plug the other end of the cable into the power source.

NOTE
Do not connect the device to the network until the IP addresses are configured.

For information about LED patterns, see Connecting a DC power cord.

Initial Configuration

- Preparing to configure the device 35
- Establishing a serial connection to the device 37
- Logging in to the serial console port 38
- Changing the RBridge ID 39
- Assigning permanent passwords 39
- Configuring the IP addresses 40
- Logging off the serial console port and disconnecting the serial cable 41
- Establishing an Ethernet connection 41
- Customizing a host name 42
- Customizing a chassis name 42
- Setting the date and time 43
- Configuring operating modes on 27x40 GbE line cards 45
- Saving the configuration changes 46
- Verifying correct operation 46
- Backing up the configuration 47
- Connecting network devices 47
- Installing transceivers and attaching cables 48
- Managing cables 49

Preparing to configure the device

The device must be configured before it is connected to the fabric, and all of the configuration commands must be entered through the active management module. The basic device configuration includes the following parameters:

- RBridge ID, if you are going to have more than one device in a fabric.
- IP address and gateway address for the device
- IP addresses, host names, and gateway addresses for one or two management modules, as needed
- Host name

You also need to change passwords from their default values and set the time and date, either by the way of NTP or manually.

The configuration information is mirrored to the standby management module, if you have installed one, which allows the current configuration to remain available even if the active management module fails. The configuration information is stored in the CID cards and the flash memory of the management modules. The configuration can be backed up to a workstation (uploaded) and then downloaded to the active management module if necessary.

The device boots up in VCS™ fabric cluster mode and will attempt to form ISLs with connected VCS-enabled devices,. If the chassis is not connected to another device, it forms a "single node VCS fabric." This means that the chassis operates as a standalone system, but the operational mode is always VCS-enabled.The device does not support standalone mode.

Fabric cluster mode is defined as a fabric in which the data path for nodes is distributed each member in the fabric, but the configuration path is not distributed. Each node keeps its configuration database independently. Fabric cluster mode has three major characteristics:

- The fabric is self-forming. When two or more VCS-enabled devices with unique RBridge IDs are connected to form a VCS fabric, the fabric is automatically created and the devices discover the common fabric configuration.
- The fabric is masterless. No single device stores configuration information or controls fabric operations. Any device can fail or be removed without causing disruptive fabric downtime or delayed traffic.
- The fabric is aware of all members, devices, and Virtual Machines (VMs). Automatic Migration of Port Profiles (AMPP) supports VM migration to another physical server. If the VM moves, it is automatically reconnected to all of its original resources.

When the device connects with a VCS cluster, negotiation protocols determine which device in the fabric is the principal switch an makes sure that all domain IDs, and therefore RBridge IDs, are unique. Once the domain IDs are determined to be unique, they are equated to the RBridge IDs. The device with the lowest World Wide Name (WWN) becomes the principal switch, primarily for purposes of determining the uniqueness of the ID of the other devices in the fabric. The WWN is a unique identifier burned into the device at the factory.

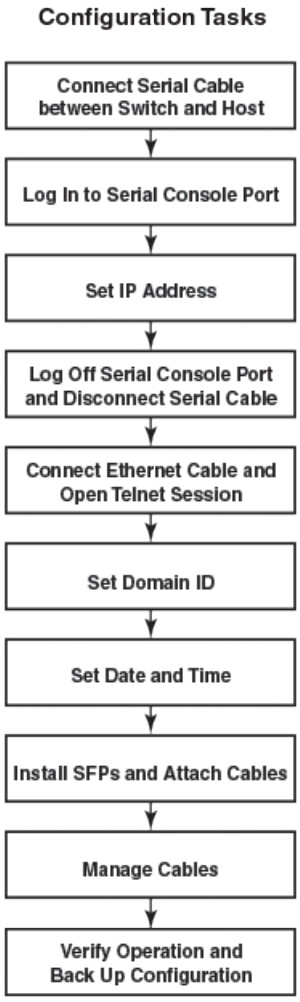
If necessary you can change the VCS ID.for the device using the **vcs vcsid***vcsid* command, where the *vcsid* is a value from 1 to 8192. By default, the device VCS ID is 1. Change the VCS ID if you need to create a new, separate VCS fabric.

In order to retain the changes made during configuration, you must copy the running configuration file to the startup configuration file using the **copy running-config startup-config** command. This will ensure that the device reboots to your preferred configuration.

Configuration tasks

The following figureillustrates the flow of the basic configuration tasks.

FIGURE 10 Configuration tasks


Configuration Tasks
Connect Serial Cable between Switch and Host
Log In to Serial Console Port
Set IP Address
Log Off Serial Console Port and Disconnect Serial Cable
Connect Ethernet Cable and Open Telnet Session
Set Domain ID
Set Date and Time
Install SFPs and Attach Cables
Manage Cables
Verify Operation and Back Up Configuration

Establishing a serial connection to the device

The serial port is located on the port side of the chassis. The device uses an RJ-45 connector for the serial port. An RJ-45 to DB9 adapter is also provided with the product. The cable supplied with the product is a rollover cable. The serial port is used to connect to a workstation to configure the device IP address before connecting the device to a fabric or IP network.

CAUTION

To protect the serial port from damage, keep the cover on the port when not in use.

To establish a serial connection to the serial (console) port on the device, complete the following steps.

1. Verify that the device is powered on and that POST is complete by verifying that all power LED indicators on the management, switch fabric, and line card modules display a steady green light.
2. Remove the shipping cap from the serial port (labeled **I0I0I**) on the active management module. By default, the management module installed in slot M1 is the active management module unless an error occurs. The active management module is also indicated by an illuminated blue LED labeled **ACTIVE** .
3. Use the serial cable provided with the product to connect the serial port on the active management module to a computer workstation.

   If the serial port on the workstation or terminal device is DB9 instead of RJ-45, remove the adapter on the end of the serial cable and insert the exposed DB9 connector into the DB9 serial port on the workstation.

NOTE
The serial port is intended primarily for the initial setting of the IP address and for service purposes.

4. Disable any serial communication programs running on the workstation (such as synchronization programs).
5. Open a terminal emulator application (such as HyperTerminal on a PC, or TERM, TIP, or Kermit in a UNIX environment), and configure the application as follows:
   - In a Windows environment, use the parameters shown in the following table.

     TABLE 6 Windows serial connection parameters

Parameter	Value
Bits per second	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	None

   - In a UNIX environment, enter the following string at the prompt:

     ```
     tip /dev/ttyb -9600
     ```

     If ttyb is already in use, use ttya instead and enter the following string at the prompt:

     ```
     tip /dev/ttya -9600
     ```

   Refer to the Brocade VDX 8770 Switch Technical Specifications on page 95 for a listing of serial cable pinouts.

Logging in to the serial console port

Log in to the device through the serial connection with the **admin** user name. The default password is *password*. While you are not required to change the password at the initial login, Brocade recommends that you change your admin and user passwords. Refer to Assigning permanent

passwords on page 39 for more details. Make sure to write down the new passwords and keep this information in a secure location.

```
Network OS (8770HOST)
8770HOST console login: admin
Password:
WARNING: The default password of 'admin' and 'user' accounts have not been changed.
Welcome to the Brocade Network Operating System Software
admin connected from 127.0.0.1 using console on 8770HOST
8770HOST#
```

Changing the RBridge ID

If you are going to have more than one device in a fabric, each device must have a unique RBridge ID. The default RBridge ID for the device is 1. Use the **vcs rbridge-id rbridge-id** command to change the default RBridge ID. You should be in privileged EXEC mode to run the command. If you have made any other configuration changes you want to persist, be sure to save your running configuration to the startup configuration before running the **vcs rbridge-id rbridge-id** command as this command reboots the device.

1. Log on to the device using the admin account (the default password is *password*).
2. Enter the **vcs rbridge-id rbridge-id** command.

```
device# vcs rbridge-id 2
This operation will change the configuration to default and reboot the switch. Do
you want to continue? [y/n]:y
```

3. Enter **y** .

   The reply to the command will include a line about the setting of the RBridge ID.

```
Successfully set rbridge-id.
```

Assigning permanent passwords

The factory-configured default accounts on the device are "admin," "user," and "root". Use the default administrative account as shown in the following table to log in to the device for the first time and to perform the basic configuration tasks.

The root account, disabled by default, is reserved for development and manufacturing. The user account is read-only and intended primarily for system monitoring.

TABLE 7 Default administrative account names and passwords

Account type	Login name	Password
Administrative	admin	password
User account (read-only)	user	password

Changing the default account passwords

When you change the default account password after you log in for the first time, only the default password rule is in effect. The rule specifies a minimum password length of eight characters. For advanced user and role management, including setting password rules, refer to the Security chapter of the *Network OS Administration Guide*.

NOTE
Passwords can be 8 to 40 characters long. They must begin with an alphabetic character. They can include numeric characters, the period (.), and the underscore (_) only. Passwords are case-sensitive, and they are not displayed when you enter them on the command line. The available roles are "admin" and "user". For more information on passwords, refer to the *Network OS Administration Guide*.

1. Log on to the device using the admin account (the default password is *password*).
2. Enter **configure terminal** to change to global configuration mode.

```
device# configure terminal
Entering configuration mode terminal
```

3. Enter the **configure terminal** command to enter global configuration mode.
4. Enter the **username** command followed by the account name and the password parameter.
5. When prompted, enter the new password. and press **Enter** .

   Following is an example of using these commands:

```
device# configure terminal
Entering configuration mode terminal
device(config)# username admin password [new-password]
(<WORD>;;User password satisfying password-attributes):********
```

Configuring the IP addresses

You must configure the device with a static IP address in IPv4 or IPv6 format . DHCP is not supported.

Setting a static IP address

Complete the following steps to set a static IP address.

1. Log in to the device using an account that has the admin role.
2. Enter global configuration mode using the **configure terminal** command.
3. Specify the chassis with the **rbridge-id** command.

```
device(config)# rbridge-id 1
```

4. Use the **chassis virtual-ip** command to set the IP address for the chassis.

```
device(config-rbridge-id 1)# chassis virtual-ip 10.20.236.132/20
```

5. Return to configuration mode by entering **exit** .
6. Use the **ip address** command to set the Ethernet IP address for the management modules.

   If you are going to use an IPv4 IP address, enter the IP address in dotted decimal notation. You should also enter a gateway address as well.

When you have assigned the IP and gateway addresses to management interface 1/1, you should also assign IP and gateway addresses to management interface 1/2 if you have installed a second management module.

```
device(config)# interface Management 1/1
device(config-Management-1/1)# no ip address dhcp
device(config-Management-1/1)# ip address 10.24.85.81/20
device(config-Management-1/1)# ip gateway-address 10.24.80.1
```

NOTE
The **ip gateway-address** command will not be available on the device if the Layer 3 or Advanced license is installed. In that case, use the following command sequence

```
switch(config)# rbridge-id 1
switch(config-rbridge-id 1)# ip route 0.0.0.0/0 <default-gateway>
```

If you are going to use an IPv6 address, enter the network information in semicolon-separated notation as prompted after the **ipv6 address** operand. You should also disable DHCP.

```
device(config)# interface Management 1/1
device(config-Management-1/1)# no ip address dhcp
device(config-Management-1/1)# ipv6 address \
fd00:60:69bc:832:e61f:13ff:fe67:4b94/64
```

7. Return to privileged EXEC mode by entering **exit** .

```
device(config)# exit
device#
```

8. To display the configuration, use the **show running-config interface Management** command.

```
device# show running-config interface Management 1/1
interface Management 1/1
 no ip address dhcp
 ip address 10.24.85.81/20
 ip gateway-address 10.24.80.1
 ipv6 address fd00:60:69bc:832:e61f:13ff:fe67:4b94/64
 no ipv6 address autoconfig
!
```

Logging off the serial console port and disconnecting the serial cable

You can use the serial port to monitor error messages through the serial connection. If the serial port is no longer required, use the **logout** command to log out of the serial console, remove the serial cable, and replace the protective plug in the serial port.

Establishing an Ethernet connection

After using a serial connection to configure the IP addresses for the device, you can connect the active management module to the local area network (LAN).

NOTE
Connecting the management modules to a private network is recommended.

By establishing an Ethernet connection, you can complete the device configuration using a serial session, Telnet, or management application, such as Brocade Network Advisor.

CAUTION

To protect the Ethernet port from damage, keep the cover on the port when not in use.

Perform the following steps to establish an Ethernet connection.

1. Remove the shipping plug from the Ethernet port on the active management module.
2. Insert one end of an Ethernet cable into the Ethernet port.
3. Connect the other end to an Ethernet 10/100/1000 Base-T LAN.

   You can access the device through a remote connection using the command line by way of Telnet or any of the management tools, such as Brocade Network Advisor.
4. To complete any additional configuration procedures through a Telnet session, log in to the device by Telnet using the **admin** login. The default password is *password*.

Customizing a host name

This procedure is optional.

While still in Telnet, you can change the host name of the device. The host name can be up to 30 characters long; it can include letters, numbers, hyphens, and underscore characters; and must begin with a letter. The default host name is "sw0." The host name is displayed at the system prompt.

1. Log in to the device using an account that has the admin role.
2. Enter **configure terminal** to change to global configuration mode.
   ```
   device# configure terminal
   Entering configuration mode terminal
   ```
3. Enter **switch-attributes** followed by the RBridge ID and the **host-name** operand with the new name.

   If you have changed the RBridge ID, be sure to use that ID.

   ```
   device(config)# switch-attributes 1 host-name <host-name>
   ```
4. Record the new name for reference.
5. Enter **exit** while in global configuration mode to return to privileged EXEC node.
   ```
   device(config)# exit
   device#
   ```
6. To verify the new host name, you can run the **show running-config** command in EXEC mode.
   ```
   device# show running-config
   ```

Customizing a chassis name

This procedure is optional.

While still in Telnet, you can change the chassis name. The chassis name can be up to 30 characters long; can include letters, numbers, hyphens, and underscore characters; and must begin with a letter. The default chassis name is "VDX8770-#" where # is the number of ports.

Brocade recommends that you customize the chassis name for each platform because some of the system logs refer to the platform by its chassis name.

1. Log in to the device using an account that has the admin role.
2. Enter global configuration mode using the **configure terminal** command.
3. Enter **switch-attributes** followed by the RBridge ID and the **chassis-name** operand with the new chassis name.

   If you have changed the RBridge ID, be sure to use that ID.

   ```
   device(config)# switch-attributes 1 chassis-name B8770_prime
   ```
4. Record the new name for reference.
5. Enter **exit** while in global configuration mode to return to privileged EXEC mode.
   ```
   device(config)# exit
   device#
   ```
6. To verify the new chassis name, you can run the **show running-config switch-attributes** *rbridge-id* command.
   ```
   device#
   show running-config switch-attributes 1
   ```

Setting the date and time

The management module maintains the current date and time inside a battery-backed real-time clock (RTC) circuit. Date and time are used for logging events. The operation of the device does not depend on the date and time; a Brocade device with an incorrect date and time value functions properly. Because the date and time are used for logging, error detection, and troubleshooting, you should set them correctly.

Time zones

You can set the time zone for a device by using the **clock timezone** command. The time zone setting has the following characteristics:

- The time zone setting automatically adjusts for Daylight Savings Time.
- Changing the time zone on a device updates the local time zone setup and is reflected in local time calculations.
- By default, all devices are in the Greenwich Mean Time (GMT) time zone (0,0). If all devices in a fabric are in one time zone, it is possible for you to keep the time zone setup at the default setting.
- System services that have already started will reflect the time zone changes only after the next reboot.
- Time zone settings persist across failover for high availability.
- Time zone settings are not affected by Network Time Protocol (NTP) server synchronization.

The following regions are supported: Africa, America, Arctic, Antarctica, Asia, Atlantic, Australia, Europe, Indian, and Pacific. One of these, along with a city name, establishes the time zone. Refer to Setting the time zone on page 44.

Time synchronization

To keep the time in your network current, it is recommended that each device has its time synchronized with at least one external NTP server.

All devices in the fabric maintain the current clock server value in nonvolatile memory. By default, this value is the local device clock.

The **ntp server** command accepts multiple server addresses in either IPv4 or IPv6 format. When multiple NTP server addresses are passed, **ntp server** sets the first obtainable address as the active NTP server. If there are no reachable time servers, then the local time is the default time.

Synchronizing local time using NTP

Perform the following steps to synchronize the local time using NTP.

1. Log on to the device using the admin account (the default password is **password**).
2. Enter **configure terminal** to change to global configuration mode.

```
device# configure terminal
Entering configuration mode terminal
```

3. Enter the **ntp server***"IPv4 address"* command**,** where *IPv4 address* is the IP address of the first NTP server in IPv4 format, which the device must be able to access. The *IPv4 address* variable is optional. By default, this value is LOCL, which uses the local clock as the clock server.

```
device(config)# ntp server "132.163.135.131"
```

   To display the NTP server IP address, use the **show ntp status rbridge-id** *rbridge-id* command. If you are in global configuration mode, you must use **do** before the **show** command.

```
device(config)# do show ntp status rbridge-id 1
```

   The request is for the local device unless an RBridge ID is specified. Specify the **all** parameter to send the request to all devices in the cluster.

   To remove an NTP server, use the **no** form of the **ntp server** command.

```
devic(config)# no ntp server "132.163.135.131"
```

Setting the time zone

You must perform this procedure on *all* devices for which the time zone must be set. However, you only need to set the time zone once on each device, because the value is written to nonvolatile memory. While not necessary for device operation, setting a time zone is part of ensuring accurate logging and audit tracking. Time zone changes persist through a reboot without having to save the current running configuration.

Use the **clock timezone** command to set the time zone.

1. Log in to the device using an account that has the admin role.
2. Enter the **clock timezone region/city** command while in privileged EXEC mode.

   The following example changes the time zone to US/Pacific Standard Time.

```
device# clock timezone America/Los_Angeles
```

Setting the clock (date and time)

The following procedure sets the local clock date and time. An active NTP server, if configured, automatically updates and overrides the local clock time. Time values are limited to between January 1, 1970 and January 19, 2038.

NOTE
You should set the clock only if there are no NTP servers configured. Time synchronization from NTP servers overrides the local clock.

1. Log in to the device using an account that has the admin role.
2. Enter the **clock set** *year-month-dayT hours:minutes:seconds* command while in privileged EXEC mode.

   The following example sets the clock to March 17, 2012, 15 minutes past noon.

   ```
   device# clock set 2012-03-17T12:15:00
   ```

   If you want to show the clock and time zone settings, use the **show clock** command.

   ```
   device# show clock
   rbridge-id 1: 2012-03-17 12:15:00 America/Los_Angeles
   ```

Configuring operating modes on 27x40 GbE line cards

You can configure Performance or Density mode for the port groups on the 27x40 GbE line card . When configured in Performance mode, the third port in the group is persistently disabled, allowing the remaining two ports to operate at up to 40 Gbps. When Density mode (default) is configured, all three ports in the group are enabled, but will operate at below the 40 Gbps maximum rate.

Use the following steps to set Density and Performance modes on port groups on 27x40 GbE line cards.

1. Log in to the device using an account that has the admin role.
2. Power off the line card.

   ```
   device# power-off linecard 3
   ```

3. Issue the **configure terminal** command to enter global configuration mode.

   ```
   device# configure terminal
   Entering configuration mode terminal
   ```

4. Enter the **hardware** command to enter hardware configuration mode.

   ```
   device(config)# hardware
   ```

5. Enter the **port-group** command to enter configuration mode for a specific port group.

   There are nine port groups on the line card. To identify the port group, use the command with the appropriate values for the *rbridge-id/slot-id/port group-id* parameters. For example, 1/3/9 denotes RBridge ID 1, slot 3, and port group 9.

   ```
   device(config-hardware)# port-group 1/3/9
   ```

6. Perform one of the following steps:

   - Enter the **mode performance** command to configure Performance mode for the port group.

   ```
   device(config-port-group-1/3/9)# mode performance
   %Warning: port-group mode performance is a disruptive command.
    Please save the running-config to startup-config and a power-cycle for the
   changes to take place.
   ```

NOTE
Setting Performance mode shuts down the density-only port in the port group. The configuration is allowed only when the slot is powered off and takes effect when the slot is powered on.

Enter the **no mode performance** command to configure Density mode for a port group already configured for Performance mode.

```
device(config-port-group-1/3/9)# no mode performance
%Warning: port-group mode performance is a disruptive command.
Please save the running-config to startup-config and a power-cycle for the
changes to take place.
```

7. Exit port group configuration mode.

```
device(config-port-group-1/3/9)# exit
```

8. Exit hardware configuration mode.

```
device(config-hardware)# exit
```

9. Exit global configuration mode.

```
device(config)# exit
device#
```

10. Power on the line card.

```
device# power-on linecard 3
```

Displaying operating modes

To display the current operating mode for a specific port group, use the **show running-config hardware port-group** command with the *rbridge-id/slot-id/port group-id* parameters. Note the following responses:

- If "mode performance" displays, the port group is enabled in Performance mode.
- If "no mode performance" displays, the port group is enabled in Density mode.

Saving the configuration changes

Complete the following steps to make your changes persistent. This ensures that if you must reboot the device, the preferences you have set will be in force when the device comes back up.

1. Log in to the device using an account that has the admin role.
2. In privileged EXEC mode, enter the **copy running-config startup-config** command.

```
device# copy running-config startup-config
This operation will modify your startup configuration. Do you want to continue?
[Y/N]: Y
```

3. When the confirmation question appears, answer **Y** for Yes.

   The current running configuration, containing all of your latest changes, is saved to the startup configuration. The next time the device reboots, all of the changes will remain in force.

Verifying correct operation

Complete the following steps to verify correct operation for the device.

1. Check the LEDs to verify that all components are functional.
2. If necessary, log in to the device by Telnet, using the **admin** account.
3. Enter the **show chassis** command to verify that the device and its components are operating correctly.
4. Enter the **show interface** command to show the status of all of the ports in the line cards.
5. Enter the **show fabric all** command to verify the operation of the device in the fabric.

Backing up the configuration

NOTE
Brocade recommends that you back up the configuration on a regular basis to ensure that a complete configuration is available for downloading to a replacement management module or chassis. Be sure to append the *date* to the end of the target file names to make it clear which are the latest backups.

If you back up your configuration to a USB device, be sure to use a Brocade-branded USB device. The Brocade USB device comes pre-configured with four directories, /firmware, /config , /support, and / firmwarekey. Configuration backups are automatically saved in the /config directory.

Alternatively, you can save the configuration files to a remote host using either FTP or SCP. The destination file argument would be either ftp://username:password@host_ip_address/path/filename or scp://username:password@host_ip_address/path/filename respectively. Specifying a *path* is optional. Be sure to append the date to the target file name.

You can choose to back up the startup configuration or the running configuration or both by using the **copy** command with the appropriate parameters. The following procedure backs up the configurations to a Brocade-branded USB device.

NOTE
Passwords are not saved in the configuration file, and are not uploaded during a configuration upload.

1. Log in to the device using an account that has the admin role.
2. Insert the Brocade-branded USB device into the USB port on the active management module.
3. Enable the USB device by entering the **USB on** command while in privileged EXEC mode.
   - To back up the startup configuration, enter **copy startup-config usb://***configfile_date*.

     The *date* portion of the target file name should be the current date to indicate when the backup was made .

     ```
     device# copy startup-config usb://mystartupconfig_06142012
     ```
   - To back up the running configuration, enter **copy running-config usb://***configfile_date*.

     The *date* portion of the target file name should be the current date to indicate when the backup was made .

     ```
     device# copy running-config usb://myrunningconfig_06142012
     ```

Connecting network devices

You can connect your chassis to a variety of network devices. Refer to the following topics for some specific requirements for making these connections.

Connecting to Ethernet devices

For copper connections to a 10/100Base-TX or 1000Base-T device or another Brocade device, a crossover cable is required.

NOTE
The 802.3ab standard (automatic MDI or MDIX detection) calls for automatic negotiation of the connection between two 1000Base-T ports. Therefore, a crossover cable may not be required; a straight-through cable may work as well.

Connecting to workstations, servers, or routers

Straight-through unshielded twisted pair (UTP) cabling is required for direct UTP attachment to workstations, servers, or routers using network interface cards (NICs).

Fiber cabling is required for direct attachment to Gigabit NICs or switches and routers through fiber ports.

Connecting a network device to a fiber port

For direct attachment from the Brocade device to a Gigabit NIC, switch, or router, fiber cabling with an LC connector is required.

Testing connectivity

After you install the network cables, you can test network connectivity to other devices by observing the LEDs related to network connection and performing trace routes.

Installing transceivers and attaching cables

The following two sets of steps cover the installation of transceivers and cables for most SFP and for QSFP transceivers.

CAUTION
Before plugging a cable into to any port, be sure to discharge the voltage stored on the cable by touching the electrical contacts to ground surface.

Installing SFP and SFP+ transceivers and cables

Complete the following steps to install optical SFP and SFP+ transceivers.

1. Add the transceivers and cables to the line card ports.

   Position one of the optical transceivers so that the key is oriented correctly to the port. Insert the transceiver into the port until it is firmly seated and the latching mechanism clicks.

Transceivers are keyed so that they can only be inserted with the correct orientation. If a transceiver does not slide in easily, ensure that it is correctly oriented.

2. Position a cable so that the key (the ridge on one side of the cable connector) is aligned with the slot in the transceiver. Insert the cable into the transceiver until the latching mechanism clicks.

   Cables are keyed so that they can be inserted in only one way. If a cable does not slide in easily, ensure that it is correctly oriented.
3. Repeat step 1 and step 2 for the remaining ports.
4. If you are using direct-attach cables, you can insert them at this time.
5. Organize the cables. Refer to Managing cables on page 49
6. Verify the device port status using the **show interface** command.
7. Verify fabric connectivity using the **show fabric all** command.

Installing QSFP transceivers and cables

Complete the following steps to install the QSFP transceivers and cables in the 12x40 GbE and 27x40 GbE line cards.

Because each QSFP transceiver consists of four 10 GbE ports, be aware that any problems with one port could affect all four ports in the quad.

1. Position one of the QSFP transceivers so that the key is oriented correctly to the port.
2. Grasping the edges of the transceiver, insert the it into the port until it is firmly seated. You can feel a small click when it completely seats. If your transceiver has a bail, pull the bail up until it latches in the closed position.

   Transceivers are keyed so that they can only be inserted with the correct orientation. If a transceiver does not slide in easily, ensure that it is correctly oriented.

   When the transceiver is correctly seated, the status LED will turn solid amber.
3. Remove the protective plug from the QSFP transceiver and the protective cap from the special QSFP cable and insert it into the transceiver until it is firmly seated.

   The cables are also keyed to fit into the transceivers correctly.

   When the cable is correctly seated, the status LED will change from amber to green.
4. Repeat step 1 through step 2 for the remaining QSFP ports.
5. Organize the cables. Refer to Managing cables on page 49

Managing cables

Cables can be organized and managed in a variety of ways; for example, using cable channels on the port sides of the rack or patch panels to minimize cable management. The cable management comb is located above the modules on the port side of the chassis. Brocade recommends the following best practices for cable management.

- Leave at least 1 m (3.28 ft.) of slack for each port cable. This provides room to remove and replace the device, allows for inadvertent movement of the rack, and helps prevent the cables from being bent to less than the minimum bend radius.
- The minimum bend radius should be no smaller than ten times the cable radius. The minimum radius to which a 50 micron cable can be bent under full tensile load is 5.1 cm (2 in.). For a cable under no tensile load, that minimum is 3.0 cm (1.2 in.).
- If ISL trunking is in use, group the cables by trunking group.

- Generally, Velcro ® -type cable restraints are recommended to avoid creating sharp bends or kinks in the cables. Do not use tie wraps with optical cables because they are easily overtightened and can damage the optic fibers.
- For easier maintenance, label the fiber-optic cables and record the devices to which they are connected.
- Do not route cables in front of the air intake vents.
- Route the cables to the top of the device through the cable comb.

NOTE
Keep LEDs visible by routing port cables and other cables away from the LEDs. See "Cabling Best Practices" (available at http://www.brocade.com) for cable management guidelines.

System Monitoring

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Monitoring overview

The Brocade device is engineered for reliability and requires no routine operational steps or maintenance. This section provides information about determining the status of each component using LEDs and CLI commands. Refer to the *Network OS Administration Guide* for additional information.

There are two commands that can be especially helpful in monitoring the health status of various device components. These commands are **show chassis** and the various **show environment** commands. For details about these commands, refer to the *Network OS Command Reference*.

Determining the status of a line card

Use the following procedure to determine the status of a line card.

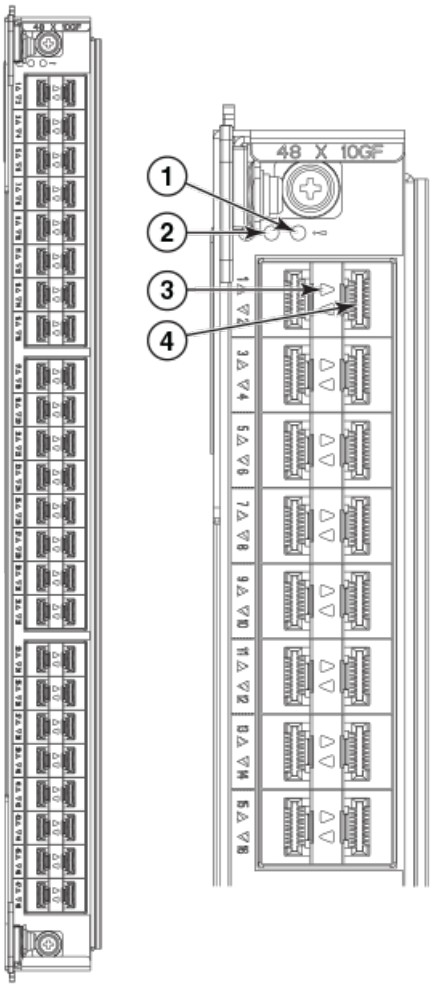
1. Locate the LEDs on the line card. Refer to the line card illustrations in the following sections.

   The LED patterns may temporarily change during POST and other diagnostic tests. For information about how to interpret the LED patterns, refer to Interpreting the line card LED indicators on page 56.
2. Use the **show linecard** or **show slots** command to determine if the line cards are enabled. The line cards are labeled L1 through L8 in the output. The **show linecard** command limits the output to the line card slots only.
3. Use the **show interface** command to determine the status of the interfaces (ports) on the line card,

Locating the LEDs on the line card

Use the following illustrations to locate the LEDs on the line cards available on the device.Full views and close-ups are provided for each line card.

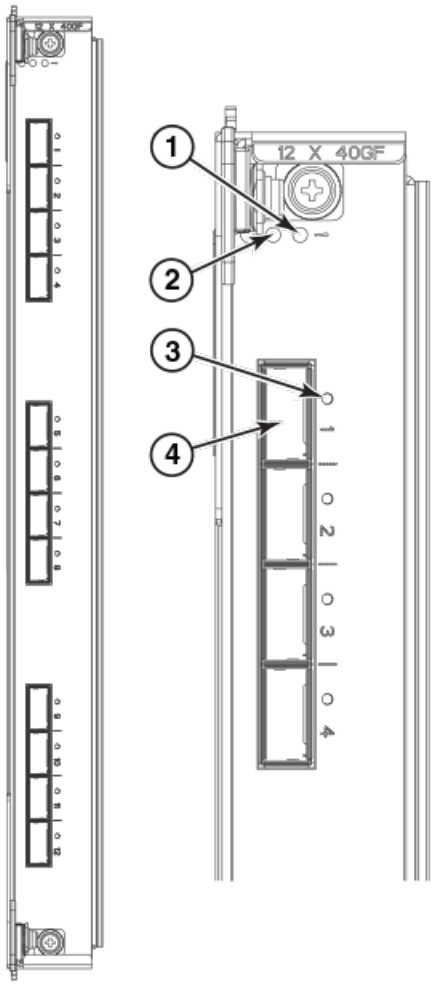
8x10 GbE line card



1	Status LED	3	Port Status LED
2	Power LED	4	GbE port

FIGURE 11 48x10 GbE line card (full view and close-up)

12x40 GbE line card

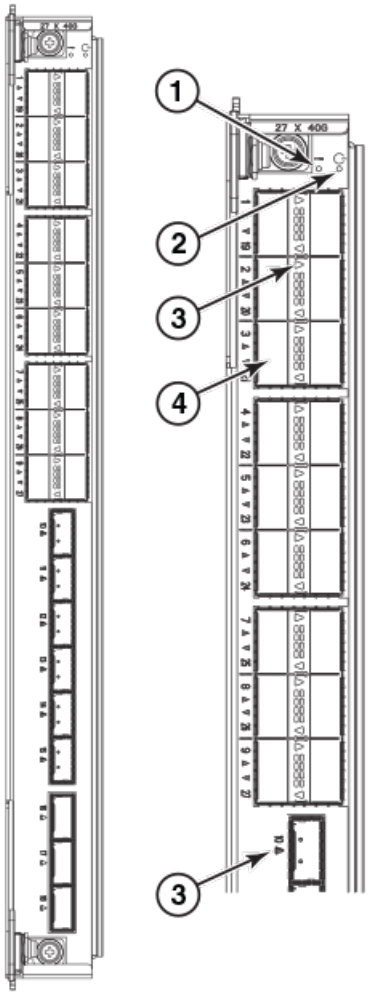


1	Status LED	3	Port Status LED
2	Power LED	4	GbE port

FIGURE 12 12x40 GbE line card (full view and close-up)

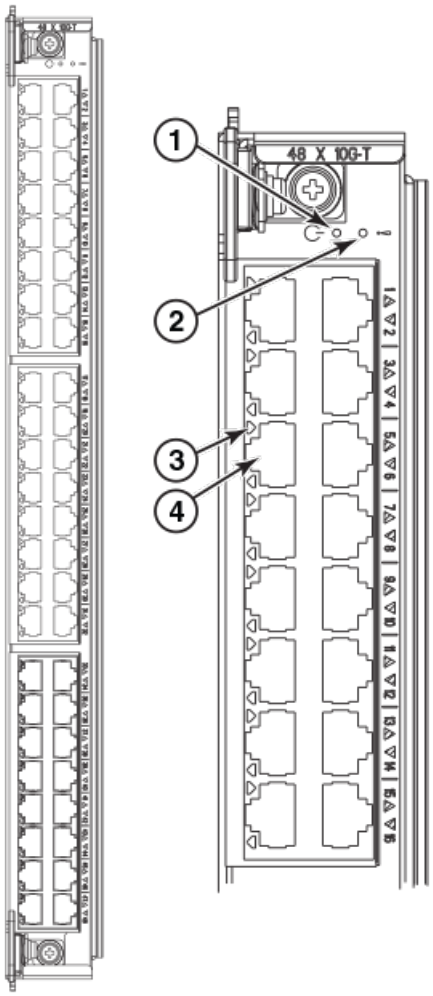
27x40 GbE line card

FIGURE 13 27x40 GbE line card (full view and close-up)



1. Status LED
2. Power LED
3. 3. 40 GbE Port Status LED
4. 40 GbE Port

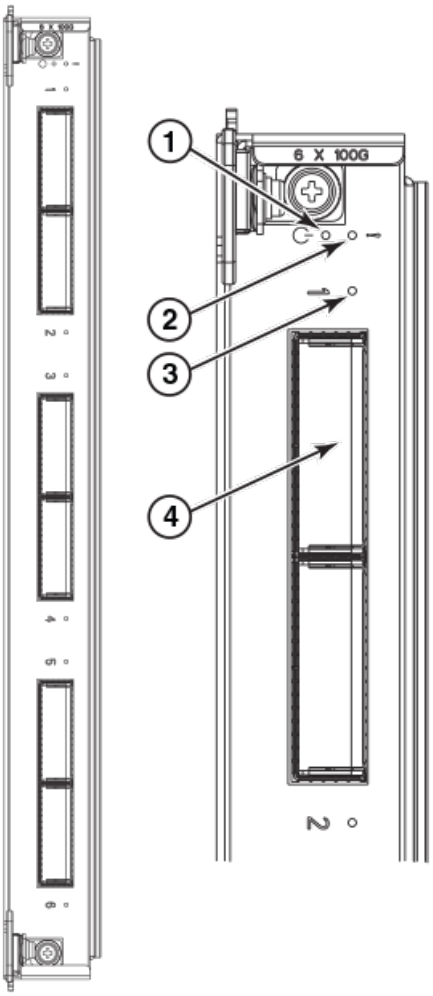
48x10G-T line card



1	Power LED	3	Port Status LED
2	Status LED	4	10 GbE port

FIGURE 14 48x10G-T line card (full view and close-up)

6x100 GbE line card



1	Power LED	3	Port Status LED
2	Status LED	4	100 GbE port

FIGURE 15 6x100 GbE line card (full view and close-up)

Interpreting the line card LED indicators

Use the following table to interpret the line card LED indications and to determine the recommended actions for each pattern.

NOTE
When the 40 GbE ports are in breakout mode on the 27x40 GbE and 12x40 GbE line cards, operating status cannot be determined from LED operation.

TABLE 8 Line card LED descriptions

LED purpose	Color	Status	Recommended action
Power LED	No light (LED is off)	Module is not powered on.	Ensure that the module is firmly seated and either the thumbscrew is fully engaged or the slider is pushed up and the ejectors are fully engaged.
	Steady green	Module is powered on.	No action required.
Status LED	No light (LED is off) Power LED steady green.	Module is operational.	No action required.
	No light (LED is off) Power LED is off.	No power.	No action required.
	Steady amber	Module is faulty or module is booting up.	If module is not booting up, ensure that the module is firmly seated and check the status by entering the **show slot** command. If the LED remains amber, consult your Brocade supplier.
	Flashing amber	Module is not seated correctly.	Pull the module out and reseat it. If the LED remains amber, replace the module.
10 GbE Port Status (48x10 GbE line card) or 1 GbE Port Status (48x1 GbE line card)	No light (LED is off)	The pluggable module (SFP/QSFP/CFP) is not inserted in the port cage or the module is inserted, but no external link is connected.	Verify that the power LED is on, check the transceiver and cable.
	Steady green	The port is online but has no traffic.	No action required.
	Flickering green	The port is online with traffic flowing through the port.	No action required.
	Steady amber	The port is receiving light but it is not online yet.	Reset the port by issuing a **shutdown** and **no shutdown** command sequence on the port.
	Slow flashing amber (on 2 seconds, then off 2 seconds)	The port is disabled.	Enable the port by issuing the **no shutdown** command.

TABLE 8 Line card LED descriptions (Continued)

LED purpose	Color	Status	Recommended action
	Fast flashing amber (on 1/4 second, then off 1/4 second)	The transceiver or port is faulty.	Change the transceiver or reset the port by issuing a **shutdown** and **no shutdown** command sequence.
	Slow flashing green (on 2 seconds, then off 2 seconds)	The port is online but segmented (either a loopback cable or incompatible device connection).	Consult the *Network OS Software Troubleshooting Guide*.
	Medium flashing green (on 1 seconds, then off 1 seconds)	Beaconing (used to identify specific ports).	No action required.
	Fast flashing green (on 1/2 second, then off 1/2 second)	Internal loopback (diagnostic).	In diagnostic mode. Will return to regular mode when diagnostic is finished.
40 GbE QSFP Port Status (12x40 GbE or 27x40 GbE line card) in 40 GbE mode	No light (LED is off)	There is no QSFP transceiver installed.	Verify that the power LED is on, ensure the transceiver is fully seated or install the transceiver.
	Steady green	The port is online but has no traffic.	No action required.
	Flickering green	The port is online with traffic flowing through the port.	No action required.
	Steady amber	The port is receiving light but it is not online yet.	Reset the port by issuing a **shutdown** and **no shutdown** command sequence on the port.
	Slow flashing amber (on 2 seconds, then off 2 seconds)	The port is disabled.	Enable the port by issuing the **no shutdown** command.
	Fast flashing amber (on 1/4 second, then off 1/4 second)	The transceiver or port is faulty.	Change the transceiver or reset the port by issuing a **shutdown** and **no shutdown** command sequence.
	Slow flashing green (on 2 seconds, then off 2 seconds)	The port is online but segmented (either a loopback cable or incompatible device connection).	Consult the *Network OS Software Troubleshooting Guide*.
	Medium flashing green (on 1 seconds, then off 1 seconds)	Beaconing (used to identify specific ports).	No action required.

TABLE 8 Line card LED descriptions (Continued)

LED purpose	Color	Status	Recommended action
	Fast flashing green (on 1/2 second, then off 1/2 second)	Internal loopback (diagnostic).	In diagnostic mode. Will return to regular mode when diagnostic is finished.
10 GbE Port Status (48x10G-T line card)	No light (LED is off)	No power to the Line card.	Verify that the power LED is on, check the transceiver and cable.
	Steady amber	The port is receiving light but it is not online yet.	Reset the port by issuing a **shutdown** and **no shutdown** command sequence on the port.
	Slow flashing amber (on 2 seconds, then off 2 seconds)	The port is disabled.	Enable the port by issuing the **no shutdown** command.
	Steady green	The port is online but has no traffic.	No action required.
	Flickering green	The port is online with traffic flowing through the port.	No action required.
	Medium flashing green (on 1 seconds, then off 1 seconds)	Beaconing (used to identify specific ports).	No action required.
100 GbE Port Status (6x100 GbE line card)	No light (LED is off)	There is no transceiver installed' or no external link connected	Verify that the power LED is on, ensure the transceiver is fully seated or install the transceiver.
	Steady green	The port is online but has no traffic.	No action required.
	Flickering green	The port is online with traffic flowing through the port.	No action required.
	Medium flashing green (on 1 seconds, then off 1 seconds)	Beaconing (used to identify specific ports).	No action required.
	Steady amber	The port is receiving light but it is not online yet.	Reset the port by issuing a **shutdown** and **no shutdown** command sequence on the port.
	Slow flashing amber (on 2 seconds, then off 2 seconds)	The port is disabled.	Enable the port by issuing the **no shutdown** command.

Determining the status of a management module

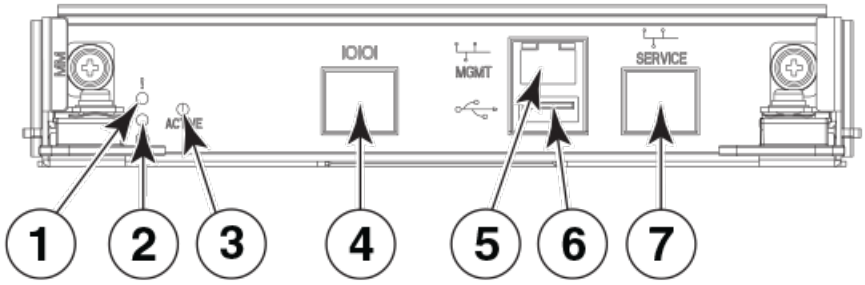
You must have at least one management module (MM) active for the chassis to be functional. For redundancy, you need two management modules. The active management module is designated by the blue Active LED on the front panel.

Complete the following steps to determine the status of an management module.

1. Locate the LED indicators on the management module (Locating the LED indicators on the management module on page 60).
2. Observe and interpret the LED pattern. The LED patterns may temporarily change during POST and other diagnostic tests. For information about how to interpret the LED patterns, refer to Interpreting the management module LED patterns on page 60.
3. Use the **show mm** command to determine whether the management modules are enabled. You can also use the **show interface management 1/1** command to see the configuration information.

Locating the LED indicators on the management module

Use the following illustration to identify the LEDs on the management module.



1 Status LED
2 Power LED
3 Active LED
4 Console port (Serial)
5 Ethernet port (Mgmt IP)
6 USB port
7 Ethernet port (Service IP)

FIGURE 16 Management module

Interpreting the management module LED patterns

Use the following table to interpret the management module LED patterns and to determine the recommended action for each pattern.

TABLE 9 Management module LED descriptions

LED purpose	Color	Status	Recommended action
Power	Steady green	MM is powered on.	No action required.
⏻	No light (LED is off)	MM is not powered on.	Ensure that the module is firmly seated and has power.

TABLE 9 Management module LED descriptions (Continued)

LED purpose	Color	Status	Recommended action
Status !	No light (LED is off)	MM is either healthy or does not have power.	Verify that the power LED is on.
	Steady amber	MM requires attention or is still booting up.	If the LED remains amber, the module is faulty. Consult your supplier.
Active	Steady blue	Module is the active MM.	No action required.
	No light (LED is off)	Module is booting up, negotiating to be the active MM, or is the standby MM.	No action required.
Ethernet management link (upper left)	Steady green	Ethernet link speed is 1000 Mbps (1 Gbps).	No action required.
	No light (LED is off)	There is no link or link speed is 10 or 100 Mbps.	No action required.
Ethernet management link activity (upper right)	Blinking green	Ethernet link is healthy and traffic is flowing through port.	No action required.
	No light (LED is off)	No traffic is flowing.	No action required.

Determining the status of a switch fabric module

At least one functional switch fabric module (SFM) must be plugged into slots S3 or S4 (the "control plane slots"). If there are no functional switch fabric module s in either slot during bootup, bootup is halted with a message indicating that condition.

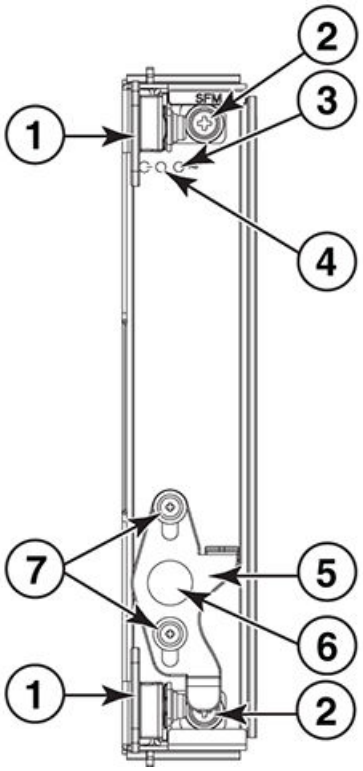
In an operational chassis, if all switch fabric module s in the control plane slots become faulty or are removed, then all the line cards will be faulted with a reason code that indicates no availability of a switch fabric module . An external RASlog message will also be displayed.

Complete the following steps to determine the status of a switch fabric module .

1. Locate the LED indicators on the switch fabric module (refer to Locating the LED indicators on the switch fabric module on page 61). The LED patterns may temporarily change during POST and other diagnostic tests. For information about how to interpret the LED patterns, refer to Interpreting the switch fabric module LED indicators on page 62.
2. Use the **show sfm** command or the **show slots** command to see whether the switch fabric module is enabled.

Locating the LED indicators on the switch fabric module

Use the following illustration to identify the LEDs on the switch fabric module.



1 Power LED
2 Status LED

FIGURE 17 Switch fabric module

Interpreting the switch fabric module LED indicators

Use the following table to interpret the switch fabric module LED patterns and to determine the recommended actions for each pattern.

TABLE 10 Switch fabric module LED descriptions

LED purpose	Color	Status	Recommended action
Power	No light (LED is off)	SFM is not on.	Ensure that the SFM is firmly seated and the power switch is turned on (slider is covering the captive screw).
	Steady green	SFM is on.	No action required.
Status	No light (LED is off)	SFM is healthy or is not powered on.	Verify that the power LED is on.

TABLE 10 Switch fabric module LED descriptions (Continued)

LED purpose	Color	Status	Recommended action
	Steady amber	SFM is faulty.	Ensure that the SFM is firmly seated and check the status by entering the **show slot** command. If the LED remains amber, consult the Brocade supplier.
	Slow flashing amber (on 2 seconds, then off 2 seconds)	SFM is not seated correctly of is faulty.	Pull the SFM out and reseat it. If the LED remains amber, replace the module.
	Fast flashing amber (on 1/2 second, then off 1/2 second)	Environmental range exceeded.	Check for the out-of-bounds environmental condition and correct it.

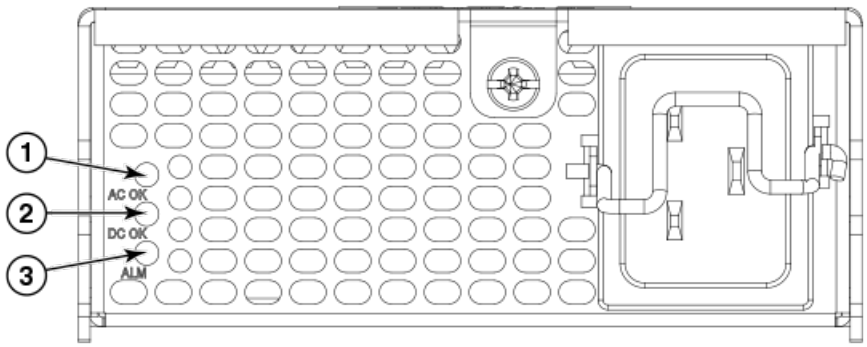
Determining the status of a power supply

Complete the following steps to determine the status of a power supply.

1. Locate the alarm LED labeled ALM on the power supply.
2. Observe and interpret the LED pattern.
3. Verify the power supply status

Locating the alarm LED on the power supply

Use the following illustration to locate the alarm LED labeled ALM on the power supply.



1	AC power input LED (AC OK)	3	Alarm LED (ALM)
2	DC power output LED (DC OK)	4	

FIGURE 18 Power supply

Use the following table to interpret the power supply LED patterns and to determine the recommended action for each pattern.

The LED patterns may temporarily change during POST and other diagnostic tests.

The Brocade VDX 8770-8 can have up to eight power supplies. Be sure to check each module.

TABLE 11 Power supply LED descriptions

LED purpose	Color	Status	Recommended action
AC OK	No light (LED is off)	Power supply does not have incoming AC power.	If using AC power, ensure that the power supply is firmly seated, the AC power source is live, and the power cable is connected.
	Steady green	Power supply has incoming AC power.	No action required.
DC OK	No light (LED is off)	The DC output is not in the acceptable range.	Ensure that the power supply is firmly seated.
	Steady green	The DC output is in the acceptable range.	No action required.
ALM	No light (LED is off)	The power supply has not failed.	No action required.
	Steady amber	The power supply has failed.	Replace the power supply.

Verifying the power supply status

You can check the power supply status by entering the **show environment power** command. Use the following table to interpret the command output. You can also use the **show system** command.

TABLE 12 Output for show environment power command

Output	Explanation
OK	Power supply is functioning correctly.
absent	Power supply is not present. Could also be improperly seated.
unknown	Unknown power supply unit installed.
predicting failure	Power supply is present but predicting failure.
faulty	Power supply is present but faulty (no power cable, power switch turned off, fuse blown, or other internal error). Could also be improperly seated.

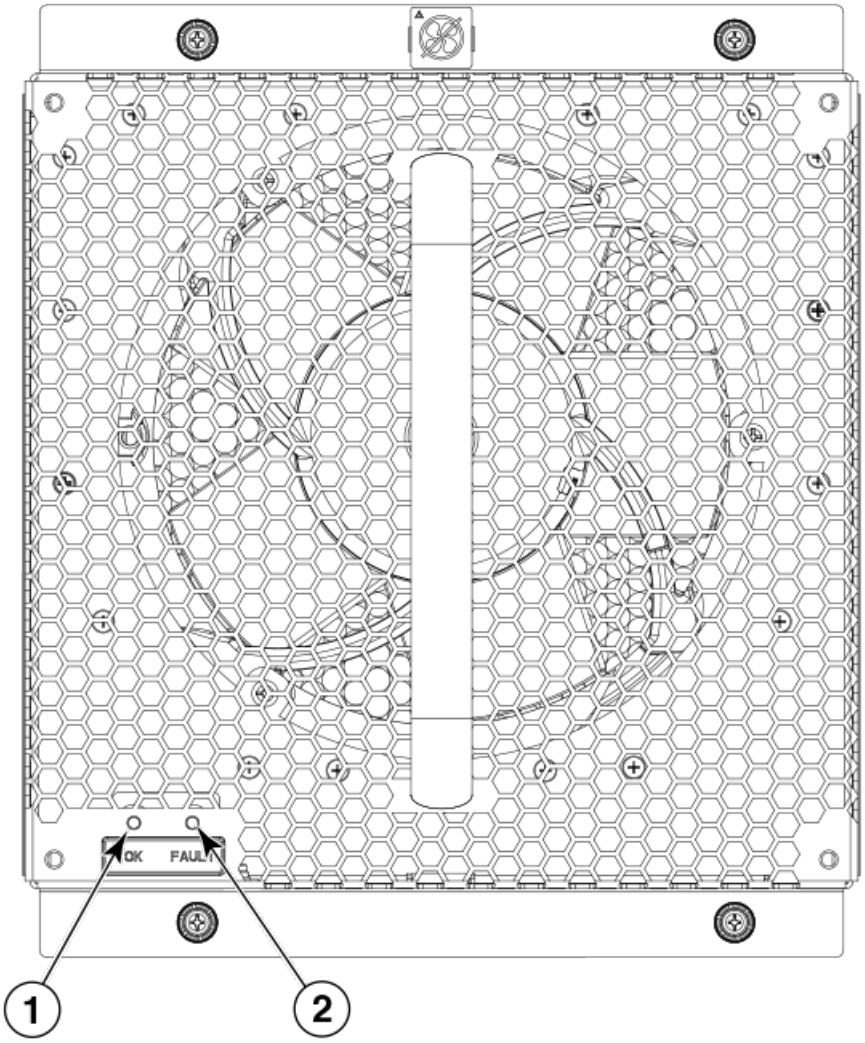
For absent or faulty indications, if the power supply is not improperly seated, contact yor Brocade supplier to order replacement parts. You may also want to do this if the indication is predicting failure.

Determining the status of a fan

Complete the following steps to determine the status of a fan.

1. Locate the LED indicators on the fan. The LED patterns may temporarily change during POST and other diagnostic tests.

   The Brocade VDX 8770-8 has up to four fans. Be sure to check each module.



1 Power LED
2 Fault LED

FIGURE 19 Fan module led indicators

2. Interpret the LED indicators and take the appropriate action.

TABLE 13 Fan LED descriptions

LED purpose	Color	Status	Recommended action
OK	No light (LED is off)	Fan does not have power.	Ensure that the fan is firmly seated and has power.
	Steady green	Fan has power.	No action required.
Fault	No light (LED is off)	Fan is either healthy or does not have power.	Ensure that the fan has power.
	Steady amber	Fan has a failure (full or partial).	Replace the fan.

3. Determine the fan status using the **show environment fan** command. (Alternately, you can use the **show system** command.)

TABLE 14 Output for show environment fan command

Output	Explanation	Recommended action
OK	The an is functioning correctly at the displayed speed (RPM).	No action is required.
absent	A fan is not present, or the fan is improperly seated.	Contact your Brocade supplier to order replacement parts.
below minimum	A fan is present but rotating too slowly or stopped.	
above maximum	The fan is rotating too quickly.	
unknown	An unknown fan unit is installed.	
faulty	The fan has exceeded hardware tolerance and has stopped. In this case, the last known fan speed is displayed. A faulty indicator could also mean that the fan is improperly seated.	

Determining the status of a CID card

Each CID card has two serial EEPROMS (seeproms). One is the critical seeprom and the other is the non-critical seeprom. Problems with the critical seeprom cannot be fixed with the CID Recovery Tool. Only issues with the non-critical seeprom can be addressed.

Regular validation tests are run by the system comparing the CID cards to each other. If the information is identical, then the chassis is operating correctly. Once a mismatch is detected, an FFDC message is output to the RASlog. Refer to following table for possible messages.

TABLE 15 Messages that may indicate CID card problems

Error message	Issue
`[EM-1020]...M1, ERROR ... A problem was found on one or both CID cards (x), please run the CIDrecov tool to get more information and recovery options.`	Some kind of error or mismatch has been detected in the CID card audit.

TABLE 15 Messages that may indicate CID card problems (Continued)

Error message	Issue
`[EM-1021], ... M1, INFO, ... A CID card has been inserted, a CID verification audit will be run to detect any mismatches or other problems.`	A second CID card is enabled and the CID card audit will be run. If an error is detected during the audit, an EM-1020 message is generated.
`[EM-1022], ... M1, WARNING, ... A CID card access problem has been encountered, please run the CIDrecov tool to get more information and recovery options.`	An error is detected during normal access to the CID cards; typically, one of the cards is corrupted or inaccessible.

Removal and Replacement Procedures

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- ESD precautions 69
- Cable management comb removal and replacement 70
- Line card removal and replacement 71
- Management module removal and replacement 74
- Switch fabric module removal and replacement 77
- Power supply removal and replacement 79
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- Air filter removal and replacement 85
- Module filler panel removal and replacement 86
- Chassis ID card removal and replacement 87
- SFP transceiver removal and replacement 88
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- Cable routing table 91

Introduction

NOTE
Read the Cautions and Danger Notices on page 107 and translations at the end of this manual before servicing.

The field-replaceable units (FRUs) can be removed from the device and replaced without special tools. The device can continue operating during many of the FRU replacements if the conditions specified in the procedures are followed.

The following sections contain FRU removal and replacement procedures.

ESD precautions

The device contains ESD-sensitive FRUs. When working with any Brocade FRU, use correct electrostatic discharge (ESD) procedures.

- Wear a wrist grounding strap connected to chassis ground (if the device is plugged in) or a bench ground. Refer to ESD precautions for the location of the ESD jack.

DANGER
For safety reasons, the ESD wrist strap should contain a series 1 megaohm resistor.

- Store ESD-sensitive components in anti-static packaging.

CAUTION

Static electricity can damage the chassis and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

Cable management comb removal and replacement

You can can continue to operate the device during the replacement of the cable management comb.

Time and items required

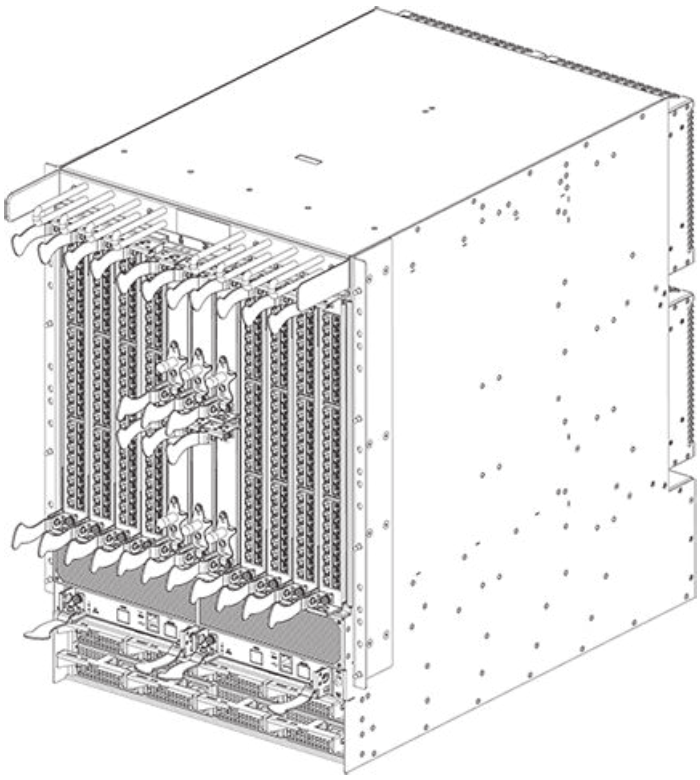
The replacement procedure for the cable management comb takes less than 5 minutes. A #1 Phillips screwdriver is required.

Removing a cable management comb

Complete the following steps to remove the cable management comb. Refer to the illustration provided with the procedure.

1. Remove the cables from the cable management comb and rearrange the cables around the comb.
2. Unscrew and save the four (4) screws holding the cable management comb to the chassis. Retain the screws. Support the cable management comb to prevent it from falling.
3. Remove the cable management comb.

FIGURE 20 Removal and replacement of the cable management comb



Replacing a cable management comb

Complete the following steps to replace the cable management comb.

1. Position and tighten the four (4) screws to secure the new cable management comb to the chassis.
2. Arrange the cables in the cable management comb.

Line card removal and replacement

This section describes the physical procedure for removing and replacing line cards in chassis slots. It does not cover the management modules or the switch fabric modules.

If are replacing a line card with a different type of line card, after removing the original line card, you must enter the Network OS **no linecard slot_number** command while in RBridge ID configuration mode to clear the current slot configuration. You must also select the new line card type using the **linecard** *slot_number linecard_type* command before installing the new line card. For more detailed command steps, consult procedures in this section for removing and replacing a line card and in the *Network OS Administration Guide*.

Install a new line card only if it is supported by the firmware running in the chassis. Inserting a line card into a chassis running firmware that does not support the line card may result in unexpected behavior.

NOTE
Any slot that is not occupied by a line card should be occupied by a filler panel to ensure correct cooling of the chassis and protection from dust.

Time and items required

The replacement procedure for each line card takes less than 10 minutes. Removing and restoring transceivers and cables may take longer depending on how many must be changed. The following items are required for the line card replacement:

- Electrostatic discharge (ESD) grounding strap
- Workstation computer
- Replacement line card or filler panel
- #2 Phillips screwdriver
- Small form-factor pluggable (SFP or SFP+) or QSFP transceivers (as needed)
- Optical and copper cables (as needed)

For details on supported transceivers, refer to the following publications:

- *Brocade VDX Transceiver Support Matrix* at http://www.brocade.com/downloads/documents/matrices/brocade-vdx-sfp-transceivers-mx.pdf.
- *Brocade Ethernet Optics Family* data sheet at http://www.brocade.com/downloads/documents/data_sheets/product_data_sheets/brocade-ethernet-optics-family-ds.pdf.

Removing a line card

Complete the following steps to remove a line card.

NOTE
If multiple modules are being replaced, complete the replacement for one module at a time.

NOTE
Follow ESD precautions while removing any line card. Refer to ESD precautions on page 69.

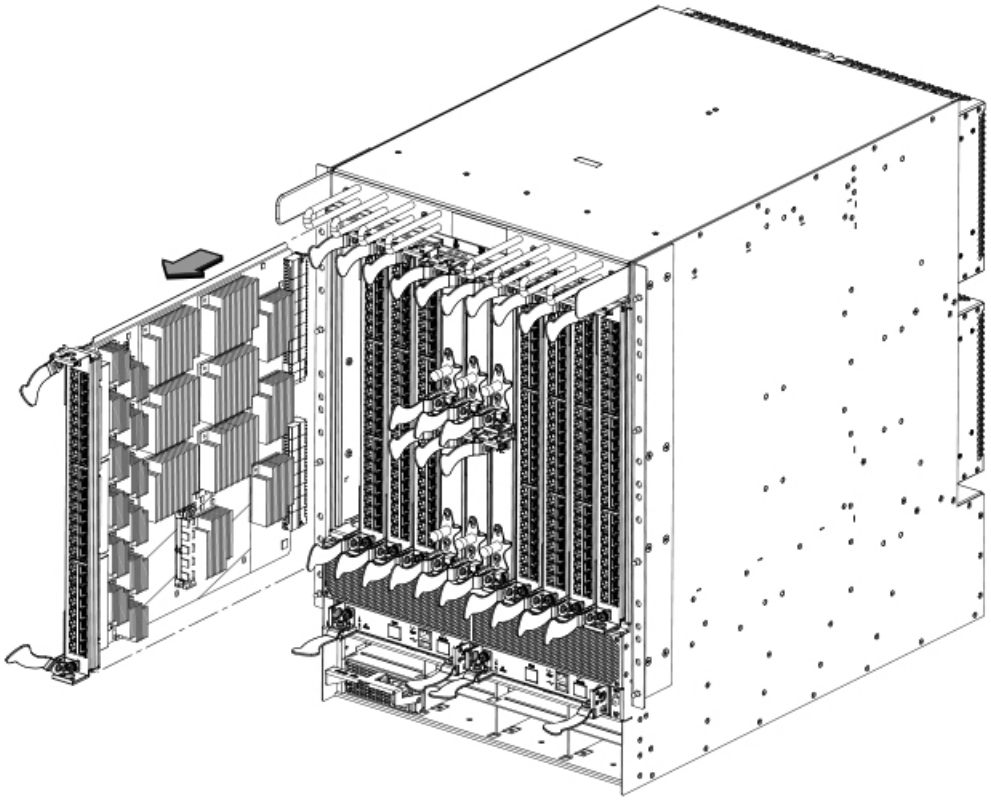
1. Check for adequate cable slack. Ensure there is plenty of cable slack to remove a line card without cable obstruction.
2. Ensure that the part number on the line card being replaced matches the replacement part number.
3. Power down the existing line card using the **power-off linecard slot_number** command.

   NOTE
   Before removing any cables from a line card, note the cable order (identify each cable by its physical port). It is a good practice to keep a table of cable to port mapping. Refer to Cable routing table on page 91 for a blank cable routing table.
4. If you are replacing the line card with a line card of a different type, follow these steps:

a) Enter the **configure terminal** command to enter global configuration mode
b) Enter the **rbridge-id** *rbridge-id*command to enter RBridge ID configuration mode.
c) Enter the **no linecard** *slot_number*command. This command removes the line card configuration and its associated interface configuration from the chassis database so a different type of line card can be used in the slot.

5. Disconnect all cables and transceivers from the line card.
6. Unscrew the two captive screws at the ends of the line card using the Phillips screwdriver.
7. Open the ejectors by rotating them toward the center of the line card face. Pull the line card out of the chassis using the ejectors.

FIGURE 21 Removal and replacement of the line card



8. If you are replacing the line card with a line card of a different type, follow these steps before replacing the line card.
   a) Enter the **linecard** *slot_number* command followed by a question mark (?) to display the line card types.
   b) Enter the **linecard** *slot_number linecard_type* command using the proper line card type.
   c) Enter the **exit** command twice to return to privileged EXEC mode.

Replacing a line card

Review the ESD precautions on page 69 before replacing a line card.

Complete this procedure to insert a new line card. Refer to the illustration provided with the procedure.

1. If you are replacing the line card with a line card of a different type, follow these steps:

a) Make sure that you have cleared the configuration for the original line card from the chassis database using steps under Removing a line card on page 72.
b) Enter the **linecard** *slot_number* command followed by a question mark (?) to display the current line card types.
c) Enter the **linecard** *slot_number linecard_type* command using the proper line card type for the new line card.
d) Enter the **exit** command twice to return to privileged EXEC mode.

2. Unpack the new line card and remove it from the anti-static bag.
3. Inspect the line card for damage.
4. Remove the protective covers from the backplane connectors.
5. Orient the line card so that the ports are at the front of the device.
6. Open the ejectors by rotating them toward the center of the line card face and align the flat side of the line card inside the top and bottom rail guides in the slot. Line cards can be inserted in any of the slots labeled L1 through L8.
7. Slide the line card all the way into the slot.
8. Close the ejectors by rotating them away from the center of the line card. The levering action of the ejectors seats the line card in the slot.
9. Tighten the captive screws using the Phillips screwdriver.
10. Check to see if the line card has powered on. If not, power on the line card using the **power-on linecard** *slot_number* command.

    Verify that the power LED on the line card is displaying a steady green light. If it does not turn on, ensure that the line card is firmly seated.

    The status LED on the line card will show amber until POST completes for the line card. It should then turn off. If it remains amber, the line card may not be properly seated in the backplane or the line card may be faulty.
11. If you have replaced a line card with a line card of a different type, follow these steps:
    a) Save the configuration persistently by issuing the **copy running-config startup-config** command after the interface module reaches the online state.
    b) Verify the configuration by issuing the **show running-config linecard** linecard command.
12. Reinstall the transceivers and cables in the line card or install new transceivers and cables if you have installed a different type of line card.
13. Group and route the cables through the cable management device.

Management module removal and replacement

This section describes how to remove and replace a management module (MM). Each device can have one or two management modules. They reside in slots M1 and M2. There must be at least one management module installed for the chassis to operate.

Time and items required

The replacement procedure for the management module takes approximately 30 minutes. The following items are required for the management module replacement:

- ESD grounding strap
- Workstation computer
- Serial cable
- IP address of an FTP server for backing up the configuration

- #2 Phillips screwdriver
- Replacement management module

Faulty management module indicators

Confirm that you need to replace the management module. The following events might indicate that a management module is faulty:

- The status LED on the management module is lit steady amber, or the power LED is not lit.
- The management module does not respond to Telnet commands, or the serial console is not available.
- The **show mm** command does not show that the management module is enabled.
- Additional information from the **show mm** command indicates a problem.
- The clock is inaccurate, or the management module does not boot up or shut down normally.

For more information about error messages, refer to the *Network OS Message Reference*.

Recording critical configuiration information

Back up the chassis configuration before you replace a management module. Refer to Recording critical configuiration information for backup information.

Removing a management module

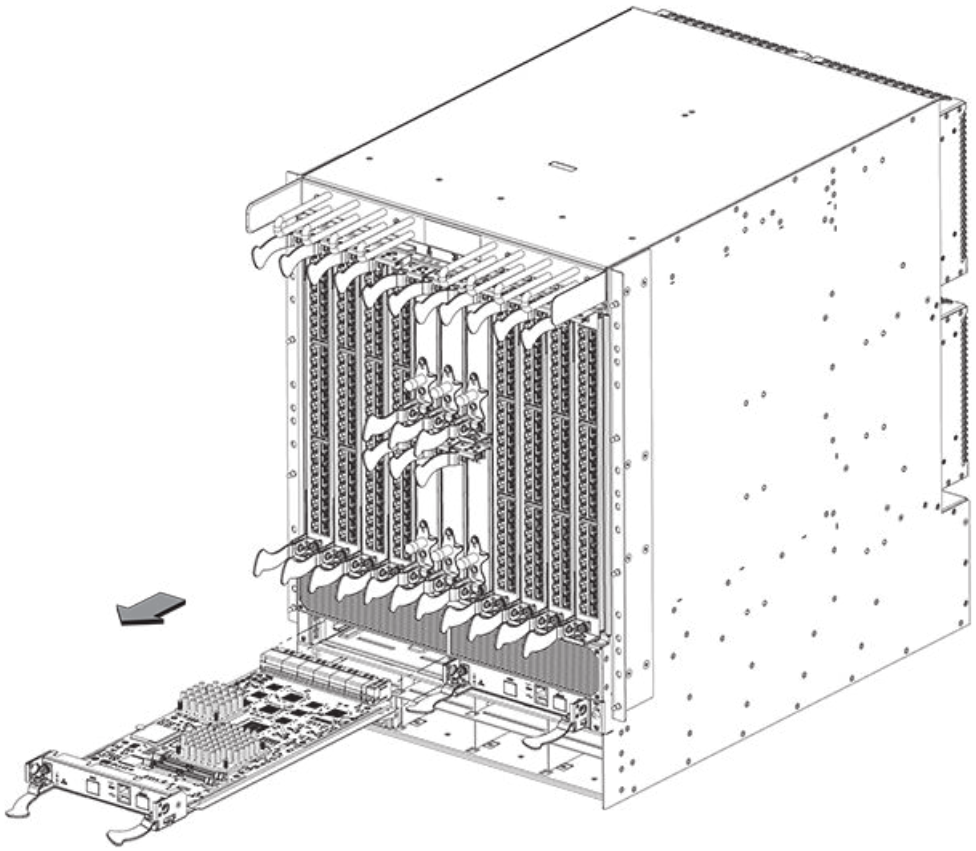
Refer to ESD precautions on page 69 before removing a management module.

The chassis continues to operate while a management module is being replaced if the redundant management module is active and a failover has already occurred.

Complete the following steps to remove a management module. Refer to the illustration provided with the procedure.

1. Remove any cables connected to the module.
2. Unscrew the captive screws from both ejectors using the Phillips screwdriver.
3. Rotate both ejectors simultaneously toward the center of the module.
4. Pull the management module out of the chassis by the ejectors.

FIGURE 22 Removal and replacement of the management module



Replacing a management module

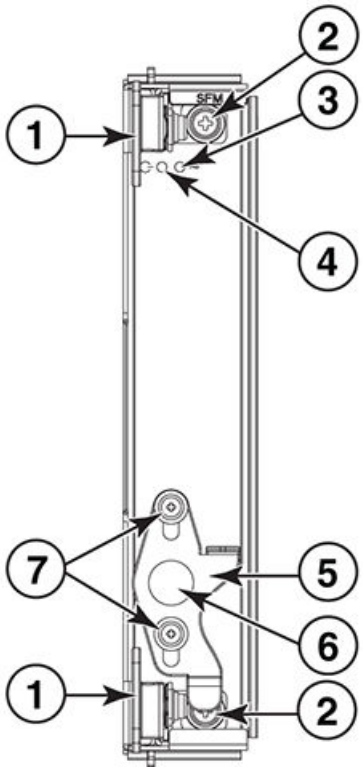
Refer to ESD precautions on page 69 before replacing a management module.

Complete the following steps to insert an management module. Refer to the illustration provided in Removing a management module on page 75.

1. Unpack the new management module and remove it from the anti-static bag.
2. Inspect the module for damage.
3. Remove the protective caps from the backplane connectors.
4. Rotate the ejectors toward the center of the module.
5. Align the module pan with the guides in the slot. The first management module should be installed in slot M1.
6. Slide the management module into the slot until it is firmly seated.
7. Rotate the ejectors away from the center of the module face until the module is tight in the slot.
8. Tighten the captive screws using the Phillips screwdriver. Verify that the power LED is green. If not, ensure that the management module has power and is firmly seated and that the ejectors are in the locked position.
9. Reconnect any cables that were attached to the old module.

Switch fabric module removal and replacement

The Brocade VDX 8770-8 has up to six Switch fabric modules (SFMs). The modules can be installed only in slots S1 through S6. There must be at least one switch fabric module installed in either slot S3 or slot S4.



1	Ejectors	5	Slider
2	Captive screws	6	Power enable pin
3	Status LED	7	Slider screws
4	Power LED		

FIGURE 23 Switch Fabric Module front view

Time and items required

The replacement procedure for the switch fabric module takes approximately 10 minutes. The following items are required for the switch fabric module replacement:

- ESD grounding strap
- #2 Phillips screwdriver
- Replacement switch fabric module

Removing a switch fabric module

You can continue to operate the device while a switch fabric module is being replaced.

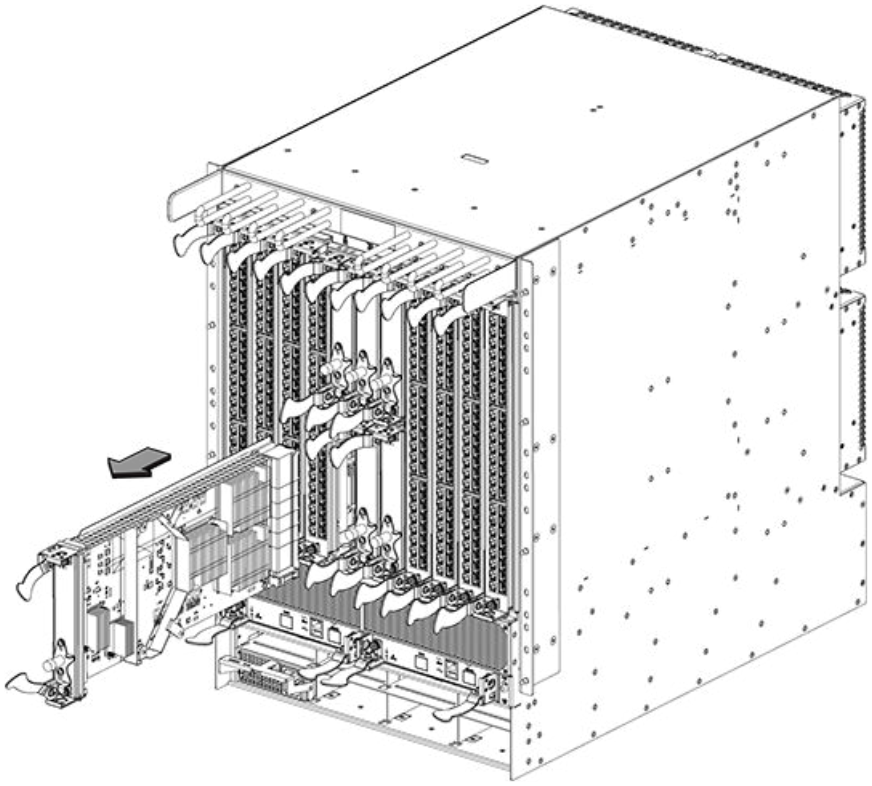
NOTE

Review and follow ESD precautions on page 69 before removing a switch fabric module..

Complete the following steps to remove a switch fabric module. Refer to the illustration provided with the procedure.

1. Unscrew the power enable pin.
2. Loosen the two screws on the slider using the Phillips screwdriver if necessary.
3. Pull out the pin and move the slider all the way up, exposing the captive screw.
4. Unscrew the two captive screws using the Phillips screwdriver.
5. Open the ejectors by rotating them toward the center of the module face. Pull the switch fabric module out of the chassis using the ejectors.

FIGURE 24 Removal and replacement of the switch fabric module



Replacing a switch fabric module

Complete the following steps to insert the switch fabric module . Refer to the illustration provided with the procedure.

NOTE

Review and follow ESD precautions on page 69 before removing a switch fabric module..

1. Unpack the new switch fabric module and remove it from the anti-static bag.
2. Inspect the module for damage.
3. Remove the protective caps from the backplane connectors.
4. Unscrew the power enable pin, pull it outward, and move the slider toward the center of the module face.
5. Open the ejectors on the new switch fabric module by rotating them toward the center of the module face. Orient the switch fabric module so that the ejectors are toward you.
6. Align the module pan with the guides in the slot. The first switch fabric module should be installed in slot S3.
7. Push the switch fabric module firmly into the slot.
8. Close the ejectors by rotating them away from the center of the switch fabric module . The levering action of the ejectors seats the module in the slot.

   The Status LED comes on.
9. Tighten the captive screws using the Phillips screwdriver.
10. Pull out the power enable pin and move the slider all the way down.
11. Screw in the power enable pin.

    The Power LED comes on.

    Tighten the screws on the slider.The Status LED goes out when the switch fabric module is fully initialized.
12. Pack the faulty switch fabric module in the packaging provided with the new switch fabric module, and contact your supplier to determine the return procedure.

Power supply removal and replacement

Use this procedure to remove and replace a power supply.

NOTE
Depending on the module configuration of the chassis and the number of power supplies installed, the device may be able to continue operating during the replacement. Refer to The Technical Specifications to determine your power requirements. If insufficient power is present, the chassis will start powering down modules until the power demand can be met.

DANGER
This device might have more than one power cord. To reduce the risk of electric shock, disconnect all power cords before servicing.

DANGER
Remove both power cords before servicing.

DANGER
Disconnect the power cord from all power sources to completely remove power from the device.

Time and items required

The replacement procedure for each power supply takes less than 5 minutes. The following items are required for the power supply replacement:

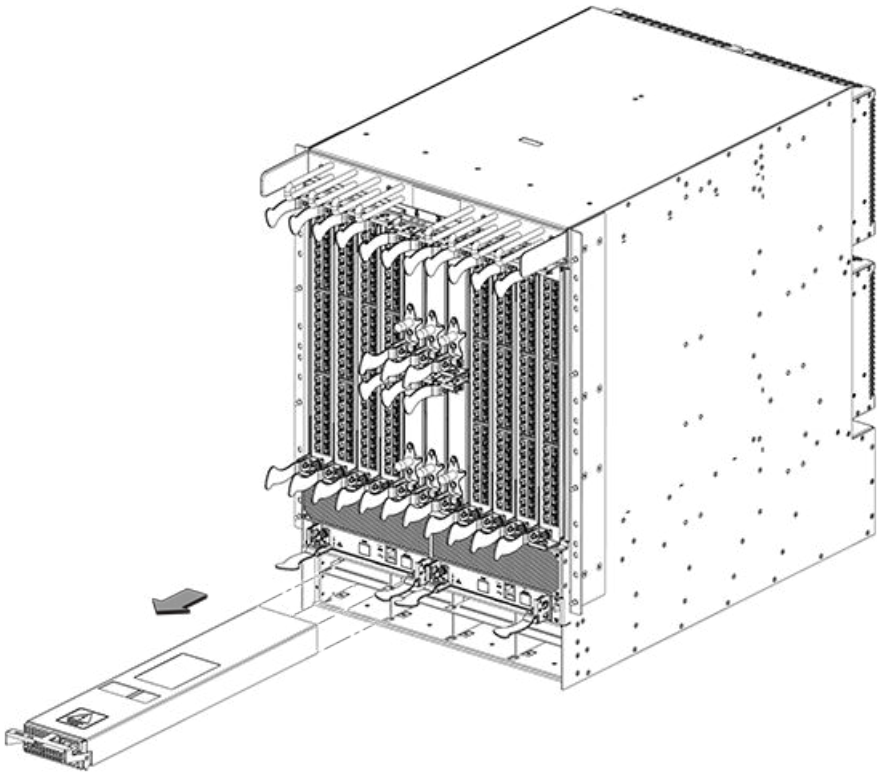
- New power supply unit or filler panel.
- #1 Phillips screwdriver.
- #2 Phillips screwdriver.

Removing an AC power supply

To remove a power supply, complete the following steps. Refer to the illustration provided with the procedure.

1. Perform the appropriate following action based on whether the device is operating:
   - If the device is not operating during the replacement procedure, go to step 2.
   - If the device is operating and will continue to operate during the replacement, check the power LEDs to verify that the minimum number of power supplies is functioning. Refer to the Technical Specifications to check your power requirements.
2. Unlatch the power cord retainer clip.
3. Remove the power cord.
4. Loosen the captive screw.
5. Push down on the handle to eject the power supply.
6. Grasp the handle and pull, sliding the power supply from the chassis and supporting the power supply from beneath as you remove it.

FIGURE 25 Removal and replacement of the power supply



Replacing an AC power supply

To replace a power supply, complete the following steps. Refer to the illustration provided with the procedure.

DANGER

High Touch Current. Earth connection essential before connecting supply.

CAUTION

If you do not install a module or a power supply in a slot, you must keep the slot filler panel in place. If you run the chassis with an uncovered slot, the system will overheat.

1. Unpack the new power supply and remove it from the anti-static bag.
2. Inspect the power supply for damage.
3. Ensure that the handle of the replacement power supply is pushed down.
4. Insert the power supply into the slot.
5. Rotate the handle upward to fully seat the power supply.
6. Tighten the captive screw. Replace the power cord.
7. Latch the power cord retainer clip.
8. Verify that the power LED on the power supply displays a steady green light.

Removing a DC power supply

To remove a DC power supply, complete the following steps.

1. If the device is operating and will continue to operate during the replacement, check the power LEDs to verify that the minimum number of power supplies is functioning. Refer to the Technical Specifications to check your power requirements.
2. Disconnect the power supply from the power source.
3. Use a #1 Phillips screwdriver to remove the screw that secures the safety cover over the power lugs. Remove the safety cover.
4. Use a #2 Phillips screwdriver to unscrew the power lugs.
5. Loosen the captive screw underneath the latch handle on the power supply faceplate.
6. Push down on the handle to eject the power supply.
7. Grasp the handle and pull, sliding the power supply from the chassis and supporting the power supply from beneath as you remove it.

Replacing a DC power supply

CAUTION

If you do not install a module or a power supply in a slot, you must keep the slot filler panel in place. If you run the chassis with an uncovered slot, the system will overheat.

To replace a DC power supply, complete the following steps.

1. Unpack the new power supply and remove it from the anti-static bag.
2. Inspect the power supply for damage.
3. Use a #1 Phillips screwdriver to remove the screw that secures the safety cover over the power lugs. Remove the safety cover.
4. Ensure that the handle of the replacement power supply is rotated down.
5. Insert the power supply into the slot.
6. Rotate the handle upward to fully seat the power supply.
7. Tighten the captive screw.
8. Reconnect the power lugs to the power supply unit.

   Connect the -48V wire to the negative terminal and the 0V wire to the positive terminal.

NOTE
The DC return must be isolated from the device ground (DC-I) when making connections to the connections to the power supply.

9. Replace the safety cover.
10. Reattach the power cord to the power source.
11. Verify that the power LED on the power supply displays a steady green light.

NOTE
This equipment installation must meet NEC/CEC code requirements. Consult local authorities for regulations.

Fan removal and replacement

Use this procedure to remove and replace a fan.

NOTE
The device can continue operating during the fan replacement

Time and items required

The replacement procedure for each fan takes less than 5 minutes. The following items are required for the fan replacement:

- Replacement fan
- #2 Phillips screwdriver

Removing a fan

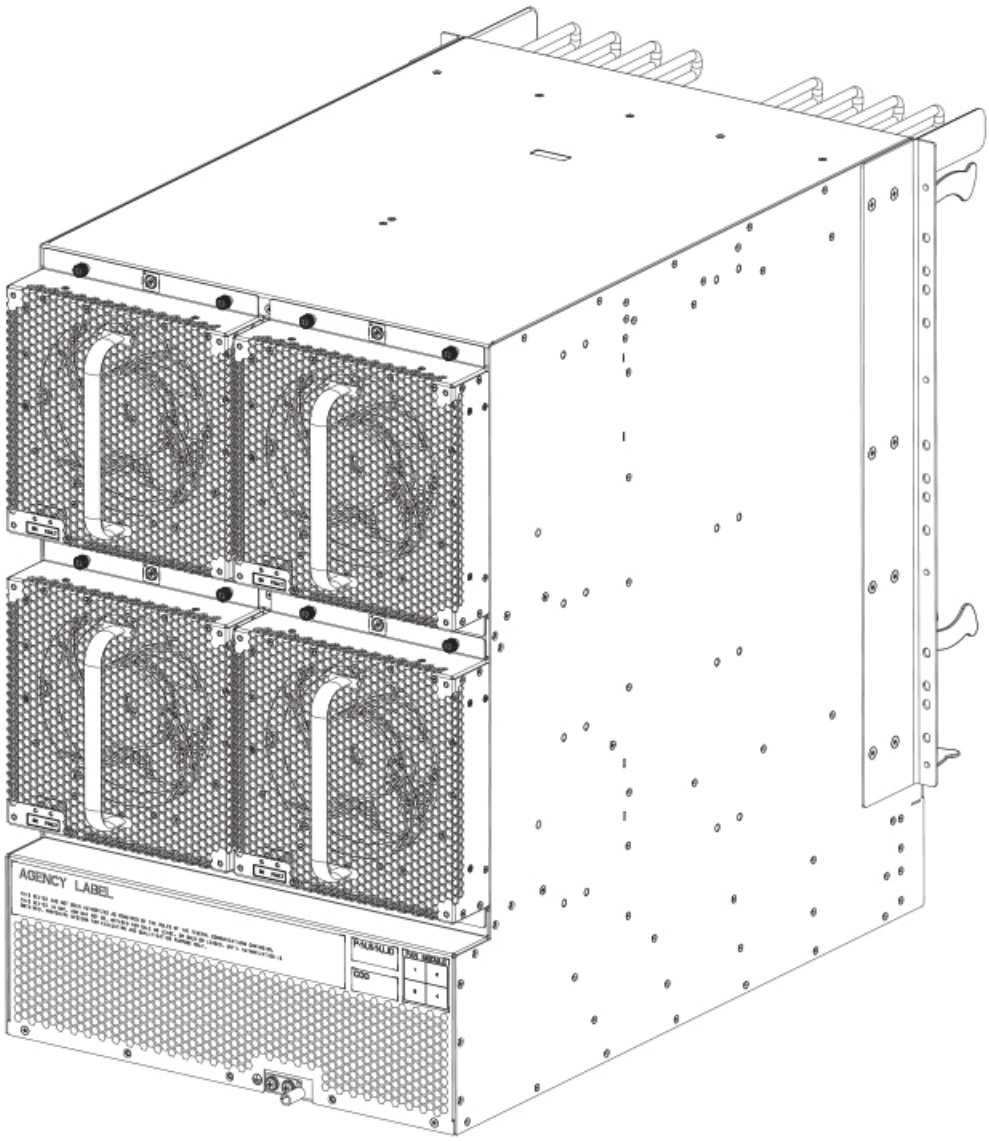
Complete the following steps to remove a fan from the chassis. Refer to the illustration provided with the procedure.

1. Before removing a fan, verify that the other fans are functioning properly. The power LEDs should be steady green.

DANGER
Be careful not to accidently insert your fingers into the fan tray while removing it from the chassis. The fan may still be spinning at a high speed.

2. Use the screwdriver to loosen the four captive screws at the top and bottom of the fan.
3. Grasp the handle and pull, sliding the fan from the chassis and supporting the fan from beneath as you remove it.

FIGURE 26 Removal and replacement of the fan



Replacing a fan

Complete the following steps to replace the fan in a chassis. Refer to the illustration provided in Removing a fan on page 83.

1. Orient the fan and slide it into the chassis, pushing firmly to ensure that it is seated.
2. Verify that the power LED displays a green light.
3. Use the screwdriver to tighten the four captive screws.

Air filter removal and replacement

You can remove and replace an air filter when it gets too clogged with dirt and dust to operate efficiently. You should perform regular physical inspections to determine how often to replace the air filter. Maintaining clean air filters ensures optimal airflow through the devices.

Based on the traffic and particulate levels of the installation location, the site operator should determine the appropriate replacement intervals for the air filter.

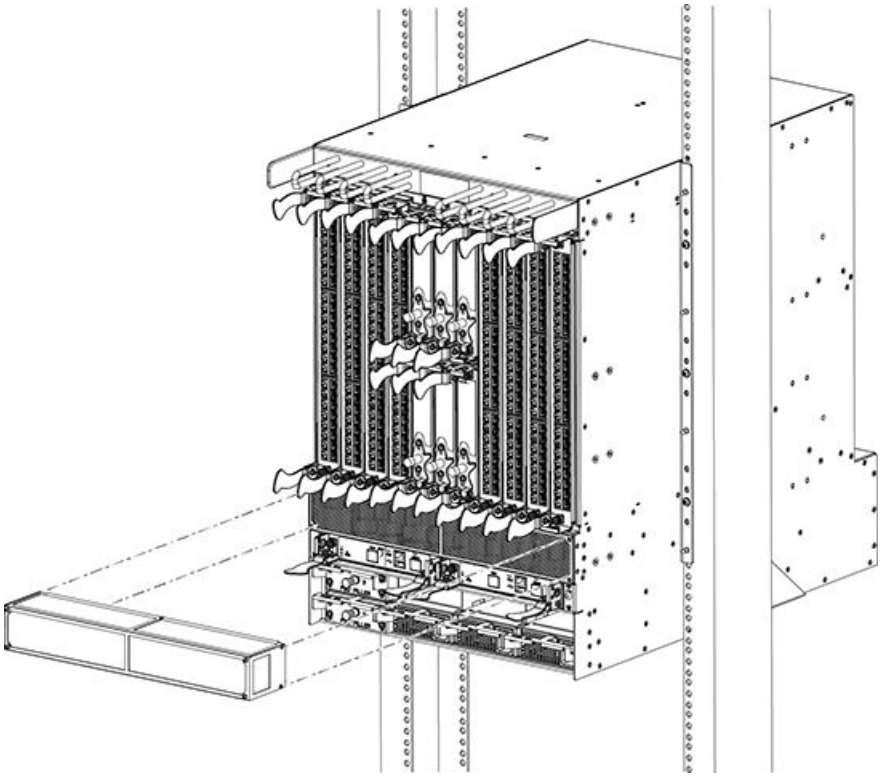
If the air filter were to become sufficiently blocked, the thermal policy of the device would notify the administrator of an environmental issue with the system.

If a site-specific interval cannot be determined by the site operator, the filter should be replaced on an interval of every 3 months.

The filters are single use and non-recyclable. They have a UL fire rating of FLAME RETARDANT, UL 94HF-1 UAF and PPI measurement of 25.

The chassis is shown in a two-post mid-mount rack configuration, but the mounting of the air filter is the same for any rack mount. Refer to the following illustration.

FIGURE 27 Removal and replacement of the air filter



Time and items required

The replacement procedure for the air filter takes less than 5 minutes. Be sure to have the following items available:

- New air filter
- A #2 Phillips screwdriver

Removing an air filter

Complete the following steps to remove a front air filter from the chassis.

1. While holding the air filter in place, unscrew the four captive mounting screws using the #2 Phillips screwdriver.
2. Carefully remove the air filter from the chassis.

   To avoid having captured particulates drawn into the chassis, remove the filter in a fashion that maintains the orientation of the filter relative to the system until the filter is 12 inches away from the intake.

Replacing an air filter

Complete the following steps to mount the new front air filter on the chassis.

1. Orient the new filter over the four mounting holes using the screws as guides.

   Be sure the side marked BOTTOM is on the bottom.
2. Using the #2 Phillips screwdriver, initiate the threads, two turns per screw, until all four are started.
3. Tighten all four screws, one at a time.

   Do not overtighten the screws as this will compromise the frame, admitting unfiltered air.

Module filler panel removal and replacement

Each removable module in the chassis (except the fans) has a matching filler panel that must be in place if no module is installed in a slot. This includes management modules, switch fabric modules, line cards, and power supplies. There are no filler panels for the fans because all fans must be installed on the chassis.

CAUTION

If you do not install a module or a power supply in a slot, you must keep the slot filler panel in place. If you run the chassis with an uncovered slot, the system will overheat.

Removing a filler panel

A filler panel should be removed only when being replaced with a new module or another filler panel. Any slot that is not occupied by a module should be occupied by a filler panel to ensure proper cooling of the chassis and protection from dust.

CAUTION

If you do not install a module or a power supply in a slot, you must keep the slot filler panel in place. If you run the chassis with an uncovered slot, the system will overheat.

Filler panels for the management module and switch fabric module are the same. The filler panel for the line card slot is similar, though larger. Both the management module and switch fabric module

panels and line card panels have two release pins and sliders. The filler panel for the power supply slot is quite different, having only one release pin and slider.

Complete the following steps to remove a filler panel from the chassis.

1. Pull the release pin or pins out and simultaneously move the slider or sliders.

   The entire face of the power supply filler panel is a slider and it moves upward to release the panel.

   The sliders for the management module and switch fabric module and line card filler panels move toward the center of the panel to release it.
2. Pull the filler panel out of the chassis using the release pins.

Replacing a filler panel

Do not leave a slot empty. This will adversely affect cooling of the chassis.

CAUTION

If you do not install a module or a power supply in a slot, you must keep the slot filler panel in place. If you run the chassis with an uncovered slot, the system will overheat.

1. Orient the filler panel.

   The management module and switch fabric module and line card filler panels must be aligned with the slot guides.

   The power supply filler panels simply fit into the slots.
2. Slide the filler panel into the slot until it is firmly seated.

   The power supply panel may slide too far into the slot. Insert it only until the facing matches the facing of the other power supplies or filler panels.
3. Move the sliders and release the release pins.

   The release pins should retract completely.

Chassis ID card removal and replacement

Chassis ID (CID) cards cannot be removed or replaced by customers. If you experience a CID card failure, call Brocade Technical Support.

When an error is detected, you can run the CID Recovery Tool to pinpoint the problem and, in some cases, fix it. If the problem is determined to be in the critical seeprom portion of the card, no recovery is possible and you must contact Brocade Technical Support. If however, the problem is in the non-critical seeprom, it is possible that you can use the recovery tool to fix the problem.

To run the CID Recovery Tool, enter the following command in Privileged EXEC mode.

```
sw0# cidrecov
```

If the problem is in the critical seeprom, the output indicates that you should call Brocade Technical Support. If the problem is in the non-critical seeprom, the output describes the issue and the affected data and gives you several possible options for action.

For more detail concerning these options, refer to the "Using the Chassis ID (CID) Recovery Tool" chapter in the *Network OS Software Troubleshooting Guide* and the "cidrecov" topic in the *Network OS Command Reference*.

TABLE 16 Options for the CID Recovery Tool

Condition	Recovery Option
One non-critical seeprom is corrupted.	Tool displays the CID to be recovered and prompts to continue or abort.
Both non-critical seeproms are corrupted.	Tool displays both CIDs to be recovered with default data and prompts to continue or abort.
Neither non-critical seeprom is corrupted but there is a data mismatch.	Tool prompts for the CID to be recovered or to abort.
No corruption or mismatch is found.	Tool displays that there is nothing to be done and then exits on acknowledgment.

SFP transceiver removal and replacement

Use the following procedure to remove and replace an SFP or SFP+ transceiver.

DANGER

All fiber-optic interfaces use Class 1 lasers.

DANGER

Laser Radiation. Do Not View Directly with Optical Instruments. Class 1M Laser Products.

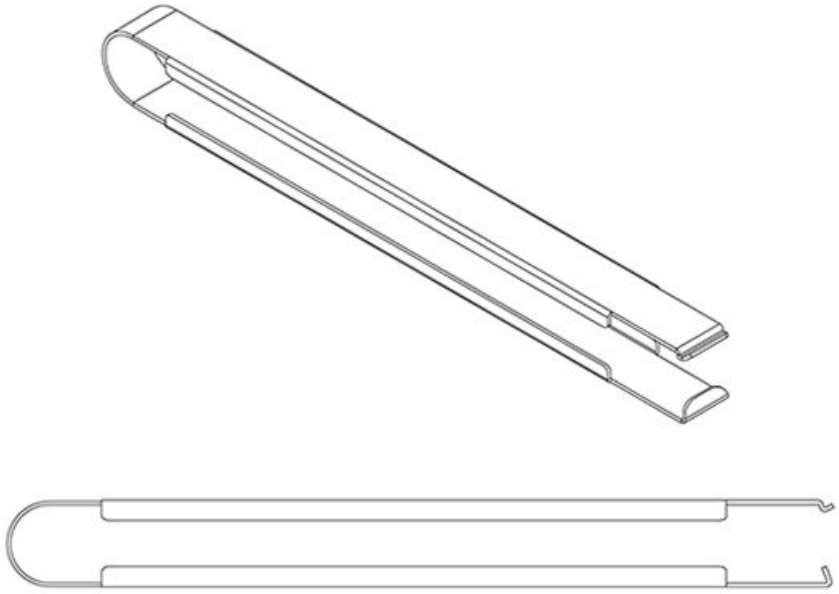
Time and items required

The replacement procedure for one transceiver takes less than 5 minutes. You should have the following items available:

- Replacement SFP or SFP+ transceiver
- Optical transceiver extraction tool

Most Brocade devices and backbones come with an optical transceiver extraction tool (Figure 28) and holster. The extraction tool is designed to remove transceivers from modules where the space is limited.

FIGURE 28 Optical transceiver extraction tool

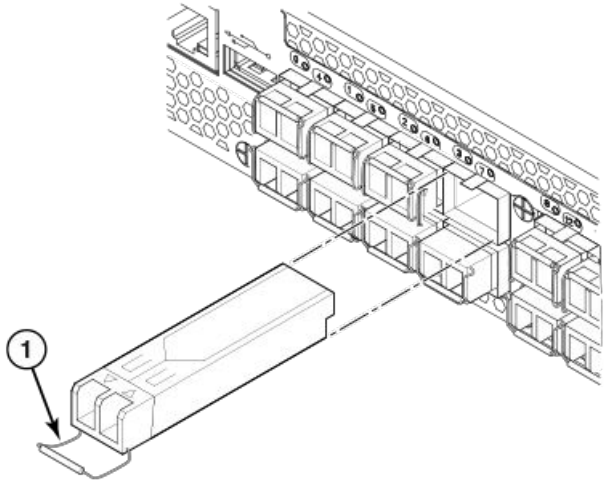


Removing a transceiver

For the following procedure refer to the illustration.

Complete the following steps to remove an SFP or SFP+ transceiver.

1. Remove any cables that are inserted into the transceiver. Use the extraction tool to open the cable latching mechanism.
2. Using the hooked end of the tool, pull the bail (wire handle) away from its pivot point and out, sliding the transceiver out of the device or module.



1 SFP or SFP+ bail

FIGURE 29 Optical transceiver with bail open

Replacing a transceiver

Complete the following steps to replace an SFP or SFP+ transceiver. Refer to the illustration in Removing a transceiver on page 89.

1. Making sure that the bail (wire handle) is in the unlocked or open position, position the optical transceiver so that the key is oriented correctly to the port. Insert the transceiver into the port until it is firmly seated and the latching mechanism clicks.

   Transceivers are keyed so that they can only be inserted with the correct orientation. If a transceiver does not slide in easily, ensure that it is correctly oriented.
2. Position a cable so that the key (the ridge on one side of the cable connector) is aligned with the slot in the transceiver. Insert the cable into the transceiver until the latching mechanism clicks.

   Cables are keyed so that they can be inserted in only one way. If a cable does not slide in easily, ensure that it is correctly oriented.

QSFP transceiver removal and replacement

Use this procedure to remove and replace a QSFP transceiver. Because each QSFP transceiver consists of four 10 GbE ports, be aware that any problems with one port could affect all four ports in the quad.

DANGER

All fiber-optic interfaces use Class 1 lasers.

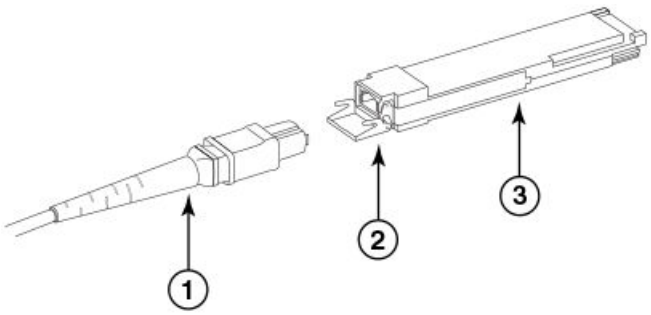
DANGER

Laser Radiation. Do Not View Directly with Optical Instruments. Class 1M Laser Products.

Removing a QSFP transceiver

Complete the following steps to remove a QSFP transceiver.

1. Remove the fiber-optic cable from the transceiver.
2. If your transceiver has an integrated pull tab, gently pull the transceiver from the port using the tab.
3. If your transceiver as a bail release, as shown in the following figure, complete the following steps.
   a) Pivot the bail on the transceiver to the horizontal position.
   b) Holding the transceiver by the bail, gently pull the transceiver out of the port.
4. Insert a protective plug into the transceiver and put it aside.



1 Fiber-optic cable
2 Bail
3 Transceiver

FIGURE 30 QSFP cable and transceiver with bail open

Replacing a QSFP transceiver

Complete the following steps to replace a QSFP transceiver.

1. Position the new QSFP transceiver so that the key is oriented correctly to the port.
2. Grasping the edges of the transceiver, gently push it into the port until it is firmly seated and the latching mechanism clicks. If your transceiver has a bail release, pull the bail up to lock the transceiver in place.

   Transceivers are keyed so that they can only be inserted with the correct orientation. If a transceiver does not slide in easily, ensure that it is correctly oriented.
3. Remove the protective plug from the transceiver.
4. Position the cable so that the key (the ridge on one side of the cable connector) is aligned with the slot in the transceiver. Insert the cable into the transceiver until the latching mechanism clicks.

   Cables are keyed so that they can be inserted in only one way. If a cable does not slide in easily, ensure that it is correctly oriented.

Cable routing table

The following table contains a 48-port template for a cable routing table. Make copies of the table to cover the total number of ports in the device.

TABLE 17 Cable routing table for the Brocade VDX 8770-8 (48 ports shown)

Slot/port		Cable labels		Connected device	Slot/port of device
Slot	Port	Switch end	Device end		
	1				
	2				
	3				

TABLE 17 Cable routing table for the Brocade VDX 8770-8 (48 ports shown) (Continued)

Slot/port	Cable labels	Connected device	Slot/port of device
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			

TABLE 17 Cable routing table for the Brocade VDX 8770-8 (48 ports shown) (Continued)

Slot/port	Cable labels	Connected device	Slot/port of device
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
41			
42			
43			
44			
45			
46			
47			
48			

Brocade VDX 8770 Switch Technical Specifications

This document highlights the features and specifications for the Brocade VDX 8770-4 and Brocade VDX 8770-8 switches.

System specifications

System component	Description
Enclosure	Brocade VDX 8770-4 switch - 8U rack-mountable chassis; 10U with air duct rack kit; 19-inch EIA-compliant Brocade VDX 8770-8 switch - 15U rack-mountable chassis; 19-inch EIA-compliant
Power inlet	C19; power from port side
Power supplies	Brocade VDX 8770-4 switch - Up to four hot-swappable 3000 W AC or DC power supplies at 220 VAC or -48 VDC Brocade VDX 8770-8 switch - Up to eight hot-swappable 3000 W AC or DC power supplies at 220 VAC or -48 VDC
Fans	Brocade VDX 8770-4 switch - Two fans per chassis Brocade VDX 8770-8 switch - Four fans per chassis
Cooling	Brocade VDX 8770-4 switch - Side-to-back airflow with front-to-back duct converter option Brocade VDX 8770-8 switch - Front-to-back airflow
System architecture	Nonblocking shared memory, virtual output queued
System processors	1.5 GHz
Port-to-port latency	<4 microseconds for 64-byte packets

Ethernet

System component	Description
SFP GbE ports	Brocade VDX 8770-4 switch: • 1 GbE: 48×1 GbE line card with 48 SFP/SFP-copper ports • 10 GbE: 48×10 GbE line card with 48 SFP+ ports • 40 GbE: 12×40 GbE line card with 12 40-GbE QSFP ports; 27×40 GbE line card with 27 40-GbE QSFP ports • 100 GbE: 6×100 GbE line card with 6 100-GbE CFP2 ports Brocade VDX 8770-8 switch: • 1 GbE: 48×1 GbE line card with 48 SFP/SFP-copper ports • 10 GbE: 48×10 GbE line card with 48 SFP+ ports • 40 GbE: 27×40 GbE line card with 27 40-GbE QSFP ports • 100 GbEE: 6×100 GbE line card with 6 100-GbE CFP2 ports
Ethernet management port	RJ-45

LEDs

System component	Description
Line Card LEDs	• Power • Status • 10 GbE Port Status (48x10G-T line card) • 10 GbE Port Status (48x10 GbE line card) or 1 GbE Port Status (48x1 GbE line card) • 40 GbE QSFP Port Status (12x40 GbE or 27x40 GbE line card) in 40 GbE mode • 100 GbE Port Status (6x100 GbE line card)
Management Module LEDs	• Power • Status • Active • Ethernet Management link (upper left) • Ethernet Management link activity (upper right)
Switch Fabric Module LEDs	• Power • Status
Power Supply LEDs	• AC power input LED (AC OK) • DC power output LED (DC OK) • Alarm LED (ALM)
Fan LEDs	• OK • Fault

Other

System component	Description
Serial Cable	RJ-45 console cable
RJ-45 to DB9 adapter	RJ-45 to DB9 for console cable
RJ-45 connector	Uses an RJ-45 connector for the serial port

Weight and physical dimensions

"Fully loaded" Brocade VDX 8770-4 switch: 192-port configuration with four line cards, including two management modules, three switch fabric modules, two fans, four power supplies, and two cable management finger assemblies.

"Fully loaded" Brocade VDX 8770-8 switch: 384-port configuration with eight line cards, including two management modules, six switch fabric modules, four fans, eight power supplies, and one cable management comb.

Model	Height	Width	Depth	Weight (empty)	Weight (fully loaded)
Brocade VDX 8770-4 switch	34.7 cm 13.7 inches	43.7 cm 17.2 inches	61 cm 24 inches	31.8 kg 70 lb	86.2 kg 190 lb
Brocade VDX 8770-4 switch with air duct rack kit	40 cm 15.7 inches	43.7 cm 17.2 inches	61 cm 24 inches		
Brocade VDX 8770-4 switch with fans	34.7 cm 13.7 inches	43.7 cm 17.2 inches	66 cm 26 inches		
Brocade VDX 8770-8 switch	66.2 cm 26 inches	44 cm 17.3 inches	66 cm 26 inches	61.2 kg 135 lb	165.6 kg 365 lb

Environmental requirements

Condition	Operational	Non-operational
Ambient temperature	0°C to 40°C (32°F to 104°F) outside switch	−25°C to 70°C (−13°F to 158°F) outside switch
Relative humidity (non-condensing)	5% to 90% at 40°C (104°F)	10% to 90% at 70°C (158°F)

Condition	Operational	Non-operational
Altitude (above sea level)	0 to 3000 m (10,000 feet)	0 to 12,000 m (40,000 feet)
Shock	20 G, 6 ms, half-sine wave	33 G, 11 ms, half-sine wave
Vibration	0.5 G, 5-500 Hz at 1.0 octave/minute	2.0 G, 5-500 Hz at 1.0 octave/minute
Airflow	Brocade VDX 8770-4 switch - Maximum: 1147 cmh (675 cfm) Brocade VDX 8770-8 switch - Maximum: 2124 cmh (1250 cfm)	N/A
Heat dissipation	Brocade VDX 8770-4 switch - Up to 6000 W or 20,500 BTU/hr Brocade VDX 8770-8 switch - Up to 11500 W or 39,250 BTU/hr	N/A

Power supply specifications (per PSU)

Power supply model	Maximum output power rating (DC)	Input voltage	Input line frequency	Maximum input current	Input line protection	Maximum inrush current
XBR-ACPWR-3000	3000 W	200 - 240 VAC (nominal) 180 - 264 VAC (range)	50/60 Hz	16 A	Line & Neutral Fused	60 A peak for <10 ms, 10 ms - 150 ms <25 A peak, >150 ms <16 A
XBR-DCPWR-3000	3000 W	–48 VDC(nominal) –40 - 60 VDC (range)	N/A	90 A	Input fuse on –48 V input	≤70 A peak initial current surge or spike of <10 ms

Power consumption (typical configuration)

Configuration of the Brocade VDX 8770-4 switch chassis: 2 management modules, 3 switch fabric modules, 4 48x10G, 2 fan FRUs; blades-enabled; Optics/Traffic 50% line rate - random packets, fans at nominal speed.

Configuration of the Brocade VDX 8770-8 switch chassis: 2 management modules, 6 switch fabric modules, 8 48x10G, 4 fan FRUs; blades-enabled; Optics/Traffic 50% line rate - random packets, fans at nominal speed.

NOTE
A 100 VAC power supply is not supported on the Brocade VDX 8770-4 and Brocade VDX 8770-8 switches.

Model name	@100 VAC input	@200 VAC input	@-48 VDC input	Minimum number of power supplies	Notes
Brocade VDX 8770-4 switch	N/A	10 A 1971 W 6728 BTU/hr	41 A 1971 W 6728 BTU/hr	1	200 VAC amps, watts, and BTU/hr are calculated with 0.98 power factor and 2 PSUs
Brocade VDX 8770-8 switch	N/A	19 A 3838 W 13,101 BTU/hr	80 A 3838 W 13,101 BTU/h	2	200 VAC amps, watts, and BTU/hr are calculated with 0.98 power factor and 4 PSUs

Power consumption (maximum configuration)

Configuration of the Brocade VDX 8770-4 switch chassis: 2 management modules, 3 switch fabric modules, 4 48x10G, 2 fan FRUs; blades-enabled; Optics/Traffic full line rate - 64-byte packet, 40°C ambient fans at full speed.

Configuration of the Brocade VDX 8770-8 switch chassis: 2 management modules, 6 switch fabric modules, 8 48x10G, 4 fan FRUs; blades-enabled; Optics/Traffic full line rate - 64-byte packet, 40°C ambient fans at full speed.

NOTE
A 100 VAC power supply is not supported on the Brocade VDX 8770-4 and Brocade VDX 8770-8 switches.

Model name	@100 VAC input	@200 VAC input	@-48 VDC input	Minimum number of power supplies	Notes
Brocade VDX 8770-4 switch	N/A	16 A 3250 W 11092 BTU/hr	68 A 3250 W 11092 BTU/hr	1	200 VAC amps, watts, and BTU/hr are calculated with 0.99 power factor and 2 PSUs

Model name	@100 VAC input	@200 VAC input	@-48 VDC input	Minimum number of power supplies	Notes
Brocade VDX 8770-8 switch	N/A	32 A 6387 W 21799 BTU/hr	133 A 6387 W 21799 BTU/hr	2	200 VAC amps, watts, and BTU/hr are calculated with 0.99 power factor and 4 PSUs

Power consumption (modules)

Module name	Module description	Maximum power consumption
MM	Management Module	50 W
SFM	Switch Fabric Module	132 W
BR-VDX8770-48x1G-SFP-1	48x1 GbE, SFP module	460 W
BR-VDX8770-48x10G-SFPP-1	48x10 GbE, SFP+ module	460 W
BR-VDX8770-12X40G-QSFP-1	12x40 GbE, QSFP+ module	440 W
BR-VDX8770-48x10G-T-1	48x10 GbE, RJ45 module	700 W
BR-VDX8770-27X40G-QSFP-1	27x40 GbE, QSFP+ module	580 W
BR-VDX8770-6x100G-CFP2-1	6x100 GbE, CFP2 module	700 W
XBR-FAN-FRU	Fan FRU for 4- and 8-slot chassis	268 W

Data port specifications (Ethernet)

Model	Port type	Number of ports	Description
Brocade VDX 8770-4 switch	1 GbE	192	Supports up to 192 1-GbE ports with four 48×1 GbE line cards
	10 GbE	192	Supports up to 192 10-GbE ports with four 48x10 GbE line cards

Model	Port type	Number of ports	Description
	40 GbE	48	Supports up to 48 40-GbE ports with four 12x40 GbE line cards
		108	Supports up to 108 40-GbE ports with four 27x40 GbE line cards
	100 GbE	24	Supports up to 24 100-GbE ports with four 6x100 GbE line cards
Brocade VDX 8770-8 switch	1 GbE	384	Supports up to 384 1-GbE ports with eight 48×1 GbE line cards
	10 GbE	384	Supports up to 384 10-GbE ports with eight 48x10 GbE line cards
	40 GbE	96	Supports up to 96 40-GbE ports with eight 12x40 GbE line cards
		216	Supports up to 216 40-GbE ports with eight 27x40 GbE line cards
	100 GbE	48	Supports up to 48 100-GbE ports with eight 6x100 GbE line cards

Serial port specifications (pinout RJ-45)

Pin	Signal	Description
1	Not supported	N/A
2	Not supported	N/A
3	TXD	Transmit data
4	GND	Logic ground
5	Not supported	N/A
6	RXD	Receive data
7	Not supported	N/A
8	Not supported	N/A

Serial port specifications (protocol)

Parameter	Value
Baud	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	None

Memory specifications

Memory	Type	Size
Main memory	SDRAM	8 GB

Regulatory compliance (EMC)

- FCC Part 15, Subpart B (Class A)
- EN 55022 (CE mark) (Class A)
- EN 55024 (CE mark) (Immunity) for Information Technology Equipment
- ICES-003 (Canada) (Class A)
- AS/NZ 55022 (Australia) (Class A)
- VCCI (Japan) (Class A)
- EN 61000-3-2
- EN 61000-3-3
- EN 61000-6-1

Regulatory compliance (safety)

- CAN/CSA-C22.2 No. 60950-1-07/UL60950-1 - Safety of Information Technology Equipment
- EN 60825-1 Safety of Laser Products - Part 1: Equipment Classification, Requirements and User's Guide
- EN 60825-2 Safety of Laser Products - Part 2: Safety of Optical Fibre Communications Systems
- EN 60950-1, IEC 60950-1 Safety of Information Technology Equipment

Regulatory compliance (environmental)

- 2011/65/EU - Restriction of the use of certain hazardous substance in electrical and electronic equipment (EU RoHS)
- 2012/19/EU - Waste electrical and electronic equipment (EU WEEE)
- 94/62/EC - packaging and packaging waste (EU)
- 2006/66/EC - batteries and accumulators and waste batteries and accumulators (EU battery directive)
- 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (EU REACH)
- Section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 - U.S. Conflict Minerals
- 30/2011/TT-BCT - Vietnam circular.
- SJ/T 11363-2006 Requirements for Concentration Limits for Certain Hazardous Substances in EIPs (China)
- SJ/T 11364-2006 Marking for the Control of Pollution Caused by EIPs (China)
- NEBS-compliant

Regulatory Statements

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BSMI statement (Taiwan)

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，
在這種情況下，使用者會被要求採取某些適當的對策。

Warning:

This is Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Canadian requirements

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations, ICES-003 Class A.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

CE Statement

ATTENTION
This is a Class A product. In a domestic environment, this product might cause radio interference, and the user might be required to take corrective measures.

The standards compliance label on this device contains the CE mark which indicates that this system conforms to the provisions of the following European Council directives, laws, and standards:

- Electromagnetic Compatibility (EMC) Directive 2004/108/EEC
- Low Voltage Directive (LVD) 2006/95/EC
- EN50082-2/EN55024:1998 (European Immunity Requirements)

- EN61000-3-2/JEIDA (European and Japanese Harmonics Spec)
- EN61000-3-3

China ROHS

Refer to the latest revision of the China ROHS document (P/N 53-1000428-xx) which ships with the product.

FCC warning (US only)

This equipment has been tested and complies with the limits for a Class A computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, might cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's own expense.

KCC statement (Republic of Korea)

A급 기기 (업무용 방송통신기기): 이 기기는 업무용(A급)으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Class A device (Broadcasting Communication Device for Office Use): This device obtained EMC registration for office use (Class A), and may be used in places other than home. Sellers and/or users need to take note of this.

VCCI statement

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI－A

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance might arise. When such trouble occurs, the user might be required to take corrective actions.

Cautions and Danger Notices

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Cautions

A Caution statement alerts you to situations that can be potentially hazardous to you or cause damage to hardware, firmware, software, or data.

Ein Vorsichthinweis warnt Sie vor potenziellen Personengefahren oder Beschädigung der Hardware, Firmware, Software oder auch vor einem möglichen Datenverlust

Un message de mise en garde vous alerte sur des situations pouvant présenter un risque potentiel de dommages corporels ou de dommages matériels, logiciels ou de perte de données.

Un mensaje de precaución le alerta de situaciones que pueden resultar peligrosas para usted o causar daños en el hardware, el firmware, el software o los datos.

General cautions

CAUTION

Do not install the device in an environment where the operating ambient temperature might exceed 40°C (104°F).

VORSICHT	Das Gerät darf nicht in einer Umgebung mit einer Umgebungsbetriebstemperatur von über 40°C (104°F) installiert werden.
MISE EN GARDE	N'installez pas le dispositif dans un environnement où la température d'exploitation ambiante risque de dépasser 40°C (104°F).
PRECAUCIÓN	No instale el instrumento en un entorno en el que la temperatura ambiente de operación pueda exceder los 40°C (104°F).

Electrical cautions

CAUTION

All devices with DC power supplies are intended for installation in restricted access areas only. A restricted access area is where access can be gained only by service personnel through the use of a special tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.

VORSICHT	Alle Geräte mit DC-Netzteil sind nur für die Installation in Bereichen mit beschränktem Zugang gedacht. Ein Bereich mit beschränktem Zugang ist ein Bereich, zu dem nur Wartungspersonal mit Spezialwerkzeug, Schlüssel oder anderen Sicherheitsvorrichtungen Zugang hat. Dieser Zugang wird von für den Bereich zuständigen Personen überwacht.
MISE EN GARDE	Tous les dispositifs avec bloc d'alimentation C.C. sont conçus pour l'installation dans des zones à accès réglementé uniquement. Une zone à accès réglementé est une zone dont l'accès n'est possible qu'au personnel de service utilisant un verrou, une clé ou un outil spécial, ou d'autres moyens de sécurité, et qui est contrôlée par les autorités responsables du site.
PRECAUCIÓN	Todos los instrumentos con suministros de corriente continua han sido diseñados únicamente para instalación en áreas restringidas. Se entiende como área de acceso restringido un lugar al que solo puede acceder personal de servicio mediante el uso de una herramienta especial, llave y cerrojo u otro medio de seguridad similar, y que esté controlado por la autoridad responsable de esa ubicación.

CAUTION

For the NEBS-compliant installation of a Brocade device with AC or DC systems, use a ground wire of at least 2 AWG. The ground wire should have an agency-approved crimped connector (provided with the device) attached to one end, with the other end attached to building ground. The connector must be crimped with the proper tool, allowing it to be connected to both ground screws on the enclosure. Before crimping the ground wire into the provided ground lug, ensure that the bare copper wire has been cleaned and antioxidant is applied to the bare wire. In addition, anti-rotation devices or lock washers must be used with all screw connections for the grounding wire.

VORSICHT	Zur NEBS-konformen Installation eines Brocade Geräts mit Gleich- oder Wechselstrom betriebenen muss zur Erdung ein Kabel der Stärke von mindestens 2 AWG verwendet werden. Das Erdungskabel muss an einem Ende mit einem zugelassenen Crimp-Anschluss (im Lieferumfang des Geräts) versehen sein und mit dem anderen Ende an die Gebäude-Erde angeschlossen werden. Der Anschluss muss mit einem geeigneten Werkzeug gecrimpt werden, damit er mit den beiden Erdungsschrauben auf dem Gehäuse verbunden werden kann. Bevor das Erdungskabel an die Erdungsöse angeschlossen wird, muss der blanke Kupferdraht gereinigt und mit einem Antioxidationsmittel behandelt werden. Außerdem müssen bei allen Schraubverbindungen des Erdungskabels Drehsicherungen oder Sicherungsscheiben verwendet werden.
MISE EN GARDE	Pour garantir la conformité de l'installation d'un dispositif Brocade avec système alimentation CC ou CA à la norme NEBS, utilisez un câble de mise à la terre d'au moins 2 AWG. Le câble de mise à la terre doit être muni d'une cosse sertie homologuée (fournie avec l'appareil) à une extrémité, l'autre extrémité étant reliée à la terre. La cosse doit être sertie avec l'outil adéquat, ce qui permet de la relier aux deux vis de mise à la terre du boîtier. Avant de sertir le câble de mise à la terre dans la cosse fournie, assurez-vous que le fil de cuivre dénudé a été nettoyé et qu'un antioxydant a été appliqué. De plus, des dispositifs antirotation ou des rondelles de frein doivent être utilisés avec tous les raccords vissés au câble de mise à la terre.

PRECAUCIÓN	Para que la instalación de un dispositivo con sistemas de CA o CC sea conforme a la certificación NEBS, utilice un cable de conexión a tierra de calibre AWG 2 como mínimo. El cable de conexión a tierra debe disponer de un conector engarzado homologado (suministrado con el dispositivo) unido a un extremo de modo que el otro extremo se conecte a la toma de tierra. El conector se debe engarzar con la herramienta adecuada de forma que se pueda conectar a los dos tornillos de conexión a tierra del compartimento. Antes de engarzar el cable de conexión a tierra a la patilla de conexión a tierra proporcionada, asegúrese de limpiar y aplicar antioxidante al alambre pelado de cobre. Además, deben emplearse los seguros contra giro o las arandelas de sujeción en todas las uniones atornilladas del cable de toma de tierra.

CAUTION

Use a separate branch circuit for each power cord, which provides redundancy in case one of the circuits fails.

VORSICHT	Es empfiehlt sich die Installation eines separaten Stromkreiszweiges für jede Elektroschnur als Redundanz im Fall des Ausfalls eines Stromkreises.
MISE EN GARDE	Utilisez un circuit de dérivation différent pour chaque cordon d'alimentation ainsi, il y aura un circuit redondant en cas de panne d'un des circuits.
PRECAUCIÓN	Use un circuito derivado separado para cada cordón de alimentación, con lo que se proporcionará redundancia en caso de que uno de los circuitos falle.

CAUTION

For the DC input circuit to the system (3000W supply), make sure there is a 80 amp circuit breaker, minimum -48VDC, double pole, on the input lugs to the power supply. The input wiring for connection to the product should be copper wire, 2 AWG, marked VW-1, and rated minimum 90o C.

VORSICHT	Bei der Gleichstromeingangsschaltung zum System (3000W supply), muss sichergestellt werden, dass an den Eingangskabelschuhen zur Stromversorgung ein zweipoliger Schalter mit UL-Zulassung, 80 Ampere und mindestens -48 V Gleichstrom vorhanden ist. Die Eingangsleitung zum Anschluss an das Produkt sollte als Kupferdraht, 2 AWG, angegeben, als VW-1 gekennzeichnet und für mindestens 90 °C bemessen sein.
MISE EN GARDE	Pour le circuit d'alimentation en courant continu du système (3000W supply), vérifier la présence d'un disjoncteur bipolaire homologué de 80 A, minimum -48 Vcc, sur l'entrée de l'alimentation. Les câbles d'alimentation du produit doivent être des fils de cuivre homologués de section 33.6 mm² (2 AWG), marqués VW-1 et testés à 90° C.
PRECAUCIÓN	Para el circuito de entrada de CC al sistema (3000W supply), verifique que existe un disyuntor catalogado por UL de 80 amperios, -48VCC como mínimo, bipolar, en las orejetas de entrada a la fuente de alimentación. El cableado de entrada para la conexión al producto deberá ser de cable de cobre catalogado, 2 AWG, marcado con VW-1, y tener una capacidad nominal mínima para 90°C.

CAUTION

Before plugging a cable into to any port, be sure to discharge the voltage stored on the cable by touching the electrical contacts to ground surface.

VORSICHT	Bevor Sie ein Kabel in einen Anschluss einstecken, entladen Sie jegliche im Kabel vorhandene elektrische Spannung, indem Sie mit den elektrischen Kontakten eine geerdete Oberfläche berühren.
MISE EN GARDE	Avant de brancher un câble à un port, assurez-vous de décharger la tension du câble en reliant les contacts électriques à la terre.
PRECAUCIÓN	Antes de conectar un cable en cualquier puerto, asegúrese de descargar la tensión acumulada en el cable tocando la superficie de conexión a tierra con los contactos eléctricos.

CAUTION

Static electricity can damage the chassis and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

VORSICHT	Statische Elektrizität kann das System und andere elektronische Geräte beschädigen. Um Schäden zu vermeiden, entnehmen Sie elektrostatisch empfindliche Geräte erst aus deren antistatischer Schutzhülle, wenn Sie bereit für den Einbau sind.
MISE EN GARDE	L'électricité statique peut endommager le châssis et les autres appareils électroniques. Pour éviter tout dommage, conservez les appareils sensibles à l'électricité statique dans leur emballage protecteur tant qu'ils n'ont pas été installés.
PRECAUCIÓN	La electricidad estática puede dañar el chasis y otros dispositivos electrónicos. A fin de impedir que se produzcan daños, conserve los dispositivos susceptibles de dañarse con la electricidad estática dentro de los paquetes protectores hasta que esté listo para instalarlos.

CAUTION

If you do not install a module or a power supply in a slot, you must keep the slot filler panel in place. If you run the chassis with an uncovered slot, the system will overheat.

VORSICHT	Falls kein Modul oder Netzteil im Steckplatz installiert wird, muss die Steckplatztafel angebracht werden. Wenn ein Steckplatz nicht abgedeckt wird, läuft das System heiß.
MISE EN GARDE	Si vous n'installez pas de module ou de bloc d'alimentation dans un slot, vous devez laisser le panneau du slot en place. Si vous faites fonctionner le châssis avec un slot découvert, le système surchauffera.
PRECAUCIÓN	Si no instala un módulo o un fuente de alimentación en la ranura, deberá mantener el panel de ranuras en su lugar. Si pone en funcionamiento el chasis con una ranura descubierta, el sistema sufrirá sobrecalentamiento.

CAUTION

Use a separate branch circuit for each power cord, which provides redundancy in case one of the circuits fails.

VORSICHT	Es empfiehlt sich die Installation eines separaten Stromkreiszweiges für jede Elektroschnur als Redundanz im Fall des Ausfalls eines Stromkreises.
MISE EN GARDE	Utilisez un circuit de dérivation différent pour chaque cordon d'alimentation ainsi, il y aura un circuit redondant en cas de panne d'un des circuits.
PRECAUCIÓN	Use un circuito derivado separado para cada cordón de alimentación, con lo que se proporcionará redundancia en caso de que uno de los circuitos falle.

CAUTION

Before plugging a cable into to any port, be sure to discharge the voltage stored on the cable by touching the electrical contacts to ground surface.

VORSICHT	Bevor Sie ein Kabel in einen Anschluss einstecken, entladen Sie jegliche im Kabel vorhandene elektrische Spannung, indem Sie mit den elektrischen Kontakten eine geerdete Oberfläche berühren.
MISE EN GARDE	Avant de brancher un câble à un port, assurez-vous de décharger la tension du câble en reliant les contacts électriques à la terre.
PRECAUCIÓN	Antes de conectar un cable en cualquier puerto, asegúrese de descargar la tensión acumulada en el cable tocando la superficie de conexión a tierra con los contactos eléctricos.

CAUTION

Static electricity can damage the chassis and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

VORSICHT	Statische Elektrizität kann das System und andere elektronische Geräte beschädigen. Um Schäden zu vermeiden, entnehmen Sie elektrostatisch empfindliche Geräte erst aus deren antistatischer Schutzhülle, wenn Sie bereit für den Einbau sind.
MISE EN GARDE	L'électricité statique peut endommager le châssis et les autres appareils électroniques. Pour éviter tout dommage, conservez les appareils sensibles à l'électricité statique dans leur emballage protecteur tant qu'ils n'ont pas été installés.
PRECAUCIÓN	La electricidad estática puede dañar el chasis y otros dispositivos electrónicos. A fin de impedir que se produzcan daños, conserve los dispositivos susceptibles de dañarse con la electricidad estática dentro de los paquetes protectores hasta que esté listo para instalarlos.

CAUTION

If you do not install a module or a power supply in a slot, you must keep the slot filler panel in place. If you run the chassis with an uncovered slot, the system will overheat.

VORSICHT	Falls kein Modul oder Netzteil im Steckplatz installiert wird, muss die Steckplatztafel angebracht werden. Wenn ein Steckplatz nicht abgedeckt wird, läuft das System heiß.
MISE EN GARDE	Si vous n'installez pas de module ou de bloc d'alimentation dans un slot, vous devez laisser le panneau du slot en place. Si vous faites fonctionner le châssis avec un slot découvert, le système surchauffera.
PRECAUCIÓN	Si no instala un módulo o un fuente de alimentación en la ranura, deberá mantener el panel de ranuras en su lugar. Si pone en funcionamiento el chasis con una ranura descubierta, el sistema sufrirá sobrecalentamiento.

Danger Notices

A Danger statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.

Ein Gefahrenhinweis warnt vor Bedingungen oder Situationen die tödlich sein können oder Sie extrem gefährden können. Sicherheitsetiketten sind direkt auf den jeweiligen Produkten angebracht um vor diesen Bedingungen und Situationen zu warnen.

Un paragraphe Danger indique des conditions ou des situations potentiellement mortelles ou extrêmement dangereuses. Des labels de sécurité sont posés directement sur le produit et vous avertissent de ces conditions ou situations

Una advertencia de peligro indica condiciones o situaciones que pueden resultar potencialmente letales o extremadamente peligrosas. También habrá etiquetas de seguridad pegadas directamente sobre los productos para advertir de estas condiciones o situaciones.

General dangers

DANGER

The procedures in this manual are for qualified service personnel.

GEFAHR	Die Vorgehensweisen in diesem Handbuch sind für qualifiziertes Servicepersonal bestimmt.
DANGER	Les procédures décrites dans ce manuel doivent être effectuées par un personnel de maintenance qualifié.
PELIGRO	Los procedimientos de este manual deben llevarlos a cabo técnicos cualificados.

DANGER

Be careful not to accidently insert your fingers into the fan tray while removing it from the chassis. The fan may still be spinning at a high speed.

GEFAHR	Die Finger dürfen nicht versehentlich in das Ventilatorblech gesteckt werden, wenn dieses vom Gehäuse abgenommen wird. Der Ventilator kann sich unter Umständen noch mit hoher Geschwindigkeit drehen.
DANGER	Faites attention de ne pas accidentellement insérer vos doigts dans le boîtier du ventilateur lorsque vous l'enlevez du châssis. Il est possible que le ventilateur tourne encore à grande vitesse
PELIGRO	Procure no insertar los dedos accidentalmente en la bandeja del ventilador cuando esté desmontando el chasis. El ventilador podría estar girando a gran velocidad.

Electrical dangers

DANGER

If the installation requires a different power cord than the one supplied with the device, make sure you use a power cord displaying the mark of the safety agency that defines the regulations for power cords in your country. The mark is your assurance that the power cord can be used safely with the device.

GEFAHR	Falls für die Installation ein anderes Stromkabel erforderlich ist (wenn das mit dem Gerät gelieferte Kabel nicht passt), müssen Sie sicherstellen, dass Sie ein Stromkabel mit dem Siegel einer Sicherheitsbehörde verwenden, die für die Zertifizierung von Stromkabeln in Ihrem Land zuständig ist. Das Siegel ist Ihre Garantie, dass das Stromkabel sicher mit Ihrem Gerät verwendet werden kann.
DANGER	Si l'installation nécessite un cordon d'alimentation autre que celui fourni avec le dispositif, assurez-vous d'utiliser un cordon d'alimentation portant la marque de l'organisation responsable de la sécurité qui définit les normes et régulations pour les cordons d'alimentation dans votre pays. Cette marque vous assure que vous pouvez utiliser le cordon d'alimentation avec le dispositif en toute sécurité.
PELIGRO	Si la instalación requiere un cordón de corriente distinto al que se ha suministrado con el instrumento, verifique que usa un cordón de corriente que venga con la marca de la agencia de seguridad que defina las regulaciones para cordones de corriente en su país. Esta marca será su garantía de que el cordón de corriente puede ser utilizado con seguridad con el instrumento.

DANGER

Make sure that the power source circuits are properly grounded, then use the power cord supplied with the device to connect it to the power source.

GEFAHR	Stellen Sie sicher, dass die Stromkreise ordnungsgemäß geerdet sind. Benutzen Sie dann das mit dem Gerät gelieferte Stromkabel, um es an die Srromquelle anzuschließen.
DANGER	Vérifiez que les circuits de sources d'alimentation sont bien mis à la terre, puis utilisez lecordon d'alimentation fourni avec le dispositif pour le connecter à la source d'alimentation.

PELIGRO	Verifique que circuitos de la fuente de corriente están conectados a tierra correctamente; luego use el cordón de potencia suministrado con el instrumento para conectarlo a la fuente de corriente

DANGER

For safety reasons, the ESD wrist strap should contain a series 1 megaohm resistor.

GEFAHR	Aus Sicherheitsgründen sollte ein EGB-Armband zum Schutz von elektronischen gefährdeten Bauelementen mit einem 1 Megaohm-Reihenwiderstand ausgestattet sein.
DANGER	Pour des raisons de sécurité, la dragonne ESD doit contenir une résistance de série 1 méga ohm.
PELIGRO	Por razones de seguridad, la correa de muñeca ESD deberá contener un resistor en serie de 1 mega ohmio.

DANGER

This device might have more than one power cord. To reduce the risk of electric shock, disconnect all power cords before servicing.

GEFAHR	Dieses System ist möglicherweise mit mehr als einem Netzkabel ausgestattet. Trennen Sie stets die Verbindung aller Netzkabel, bevor Sie Wartungsarbeiten durchführen, um dieGefahr eines Stromschlags auszuschließen.
DANGER	Ce commutateur peut comporter plusieurs cordons d'alimentation. Pour réduire les risques de choc électrique, déconnectez tous les cordons d’alimentation avant d’effectuerl’entretien de l’appareil.
PELIGRO	Este conmutador podría tener más de un cable de alimentación. Para reducir el riesgo de sufrir una descarga eléctrica, desconecte todos los cables de alimentación antes de proceder con la reparación.

DANGER

Remove both power cords before servicing.

GEFAHR	Trennen Sie beide Netzkabel, bevor Sie Wartungsarbeiten durchführen.
DANGER	Retirez les deux cordons d'alimentation avant toute maintenance.
PELIGRO	Desconecte ambos cables de alimentación antes de realizar reparaciones.

DANGER

Disconnect the power cord from all power sources to completely remove power from the device.

GEFAHR	Ziehen Sie das Stromkabel aus allen Stromquellen, um sicherzustellen, dass dem Gerät kein Strom zugeführt wird.
DANGER	Débranchez le cordon d'alimentation de toutes les sources d'alimentation pour couper complètement l'alimentation du dispositif.
PELIGRO	Para desconectar completamente la corriente del instrumento, desconecte el cordón de corriente de todas las fuentes de corriente.

DANGER

High Touch Current. Earth connection essential before connecting supply.

GEFAHR	Hoher Ableitstrom. Vor Anschluss ans Netz Schutzerdung herstellen.
DANGER	Courant de fuite élevé. Mise à la terre obligatoire avant la connexion de l'alimentation.
PELIGRO	Alta tensión al tacto. La conexión a tierra es esencial antes de conectar la alimentación.

Dangers related to equipment weight

DANGER

Make sure the rack housing the device is adequately secured to prevent it from becoming unstable or falling over.

GEFAHR	Stellen Sie sicher, dass das Gestell für die Unterbringung des Geräts auf angemessene Weise gesichert ist, so dass das Gestell oder der Schrank nicht wackeln oder umfallen kann.
DANGER	Vérifiez que le bâti abritant le dispositif est bien fixé afin qu'il ne devienne pas instable ou qu'il ne risque pas de tomber.
PELIGRO	Verifique que el bastidor que alberga el instrumento está asegurado correctamente para evitar que pueda hacerse inestable o que caiga.

DANGER

A fully populated Brocade VDX 8770-8 weighs approximately 165.56 kg (365 lb) and requires a hydraulic or assisted lift to install it.

GEFAHR	Ein vollständig bestückter Brocade VDX 8770-8 wiegt etwa 165.56 kg und erfordert zur Installation eine hydraulische oder Servo-Hebevorrichtung.
DANGER	Un commutateur Brocade VDX 8770-8 complet pèse environ 165.56 kg et requiert un dispositif de levage hydraulique ou électrique pour l'installation.
PELIGRO	Un Brocade VDX 8770-8 con la configuración completa pesa aproximadamente 165.56 kg (365 libras) y requiere un elevador hidráulico o asistido para realizar su instalación.

DANGER

Use safe lifting practices when moving the product.

GEFAHR	Beim Bewegen des Produktes ist auf eine sichere Hubtechnik zu achten.
DANGER	Utiliser des techniques de levage sûres pour déplacer le produit.
PELIGRO	Tenga mucho cuidado al levantar el producto para moverlo

Laser dangers

DANGER

All fiber-optic interfaces use Class 1 lasers.

GEFAHR	Alle Glasfaser-Schnittstellen verwenden Laser der Klasse 1.
DANGER	Toutes les interfaces en fibres optiques utilisent des lasers de classe 1.
PELIGRO	Todas las interfaces de fibra óptica utilizan láser de clase 1.

DANGER

Laser Radiation. Do Not View Directly with Optical Instruments. Class 1M Laser Products.

GEFAHR	Laserstrahlung! Schauen Sie nicht direkt mit optischen Instrumenten in den Laserstrahl herein. Klasse 1M Laserprodukte.
DANGER	Rayonnement de laser. Ne regardez pas directement avec les instruments optiques. Produits de laser de la classe 1M.
PELIGRO	Radiacion de Laser. No vea directamente con Instrumentos Opticos. Clase 1M de Productos de Laser.